Minnesota Medicine

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

Volume 33 June, 1950 No. 6

ADVANTAGES AND LIMITATIONS OF THE QUANTITATIVE VDRL SLIDE TEST

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STARTING July 1, 1950, it is planned that blood specimens giving positive VDRL serological slide tests for syphilis will be reported quantitatively. This test has been studied in the Minnesota Department of Health Medical Laboratories since October 1, 1949. The following summary of results is presented as an indication of the value and limitations of this added test procedure.

TABLE I. CORRELATION OF KOLMER-WASSERMANN WITH QUANTITATIVE VDRL SLIDE TEST RESULTS ON 3227 SPECIMENS

VDRL Test		Kolmer-Wassermann Test Result						Total VDRL Tests Positive/Dilution	
		Negative	Doubtful ± or 1+	Positive 2+	Positive 3+	Positive 4+	Anticomplementary	No.	%
Positive in Dilution	1:1024					2	2	4	.12
	1:512					2	1	3	.09
	1:256					19	6	25	.77
	1:128					50	11	61	1.89
	1:64					126	12	138	4.27
	1:32					158	12	170	5.26
	1:16	8	3	3	1	249	5	269	8.33
	1:8	32	10	12	10	298	5	367	11.37
	1:4	87	27	22	24	382	6	548	16.98
	1:2	236	84	32	39	365	11	767	23.78
	Undiluted Only	386	98	67	61	247	16	875	27.15
Total Kolmer Test Results	No.	749	222	136	135	1898	87	3227	100%
	%	23.21	6.88	4.21	4.18	58.82	2.70	100%	

Technique of the Test

The VDRL slide test for syphilis was originally published by the Venereal Disease Research Laboratories of the United States Public Health Service, Staten Island, in 1946[1], after the isolation of cardiolipin from beef heart was published by Pangborn[3] in 1941. The antigen emulsion is prepared with buffered saline and an alcoholic solution of 0.03 per cent cardiolipin and 0.9 per cent cholesterol and sufficient lecithin to give "standard" sensitivity. Basically this antigen is similar to other lipiodal antigens used prior to this time. The major advantage is in its reproducibility.

The qualitative tests are performed using 0.05 c.c. undiluted serum and 1 drop (60 drops per 1 c.c.) of antigen emulsion, and the results are read and reported as negative, weakly positive or positive. The quantitative test is done on all specimens giving a positive qualitative test on undiluted serum. Serial twofold dilutions of each specimen are prepared with saline and each one is tested in the same manner as in testing undiluted serum. The highest dilution giving a positive reaction is reported as follows:

From the Minnesota Department of Health, Section of Medical Laboratories.

The authors are indebted to H. G. Irvine, M.D., Acting Director of the Division of Venereal Diseases, Section of Preventable Diseases, for helpful suggestions in preparing this paper.

Spec. No.	Dilution 1:2	1:4	1:8	1:16	1:32	1:64	Report
103	W.P.*	Neg	Neg	Neg	Neg	Neg	Positive Undiluted Only
176	Pos	Pos	Pos	Pos	Pos	W.P.*	Positive Diluted 1:32
572	Pos	Pos	W.P.*	W.P.*	Neg	Neg	Positive Diluted 1:4

*Weakly Positive.

The major advantage of such quantitation is that it measures the strength of positivity into a much higher range than the usual gradation of 1+ through 4+ on testing only undiluted serum. For example, in the above table specimens No. 176 and 572 would both have been read positive 4+ by the older gradation method, but the quantitative tests show specimen 176 to be eight times more positive than specimen 572.

During the six-month period October, 1949, through March, 1950, 3227 specimens giving a positive result on undiluted serum with the VDRL slide test have been quantitated. Approximately 200 additional specimens gave positive VDRL slide tests, but there was insufficient serum to perform the quantitative test. We mention this group only to emphasize the importance of submitting a full vial of blood.

In the last two columns of Table I the number and percentage of specimens giving a positive result in the various dilutions is shown. Sixteen hundred and forty-two or 51 per cent of the specimens are positive only undiluted or in dilution 1:2. We can expect to find a considerable number of false positives in this group although many of these are specimens from treated cases of syphilis. No statement can be made in regard to exact specificity since clinical data is not available. The correlation of quantitative results with the Kolmer-Wassermann test results is also shown on Table I. In 993 of these 1642 specimens the Kolmer-Wassermann test also shows some reaction.

In 915 specimens, or 28 per cent, the VDRL tests are positive in dilutions 1:4 and 1:8. False positives will be unusual in this group. The Kolmer test shows some reaction in 785 of these 915 specimens.

In 670 specimens, or 21 per cent, the VDRL is positive in dilutions 1:16 or higher. False positives in this group will be exceedingly rare.

Weakly positive and negative VDRL slide tests are not shown in Table I since the quantitation procedure is not applicable to this group. Such specimens may show a reaction in the Kolmer test.

TABLE II. QUANTITATIVE VDRL SLIDE TESTS
Results on retesting 100 positive specimens.

	Tests done the same day	Second tests done 1 or 2 days later
Exact agreement	71	59
Second test one dilution higher	13	16
Second test one dilution lower	16	21
Second test two dilutions higher	0	1
Second test two dilutions lower	0	3

TABLE III. QUANTITATIVE VDRL SLIDE TESTS
Results on pairs of specimens from 210 individuals collected within one week.

	No.	%
Exact agreement	113	53.8
Second specimen 1 dilution higher	33	15.7
Second specimen 1 dilution lower	54	25.7
Second specimen 2 dilutions higher	7	3.3
Second specimen 2 dilutions lower	2	1.0
Second specimen 3 dilutions higher	1*	0.5

*Early case of syphilis—see text.

Retesting Specimens

Table II is a summary of results on retesting 100 positive specimens the same day, and one or two days later. As shown in the first column, when these specimens were retested the same day there was exact agreement in 71 per cent. Disagreement greater than one dilution was not encountered. Variables which contribute to the 29 per cent disagreement in results are as follows:

1. Variation in reading by two technicians.
2. Deviations from ideal mixing. (It is not practical to use separate pipettes for each dilution.)
3. Variation in serologic pipettes.
4. Variation in time elapsed since inactivation of the serum.

As shown in the second column of Table II, when the retesting was done one or two days later only 59 per cent gave exact agreement, 37 per cent differed by one dilution, and 4 per cent gave results differing by two dilutions. For this group additional variables contributing to disagreement are as follows:

TABLE IV. CORRELATION OF QUANTITATIVE KAHN AND QUANTITATIVE VDRL TESTS ON 628 SPECIMENS

Standard Kahn Result	Serum Dil.	Quantitative Kahn Units	VDRL Test Results											Total No.
			Neg.	W.P.	Pos. Undil. Only	Positive in Dilutions								
						1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	
Pos 4+	1:150	600									1		1	2
Pos 4+	1:100	400										1	2	3
Pos 4+	1:80	320											1	1
Pos 4+	1:60	240										3	3	6
Pos 4+	1:40	160								1	1		1	3
Pos 4+	1:20	80							1	3	9*	9		22
Pos 4+	1:10	40							14	18*	12	1		45
Pos 4+	1:5	20	1				4	20	19*	5	3			52
Pos 4+	1:2.5	10	1			9	37	36*	17	2				102
Pos 4+	0	4				8	7*	3	1					19
Pos 3+	0	3			7	29	34*	4	2					76
Pos 2+	0	2	1	4	28	25*	9	2						69
Dbt 1+	0	1		8	32*	12	5	1						58
Dbt ±	0	½ Unit		4	9*	2	2							17
Neg	0	Neg	76	40*	29	7	1							153
Number			79	56	105	92	99	66	54	29	26	14	8	628

*Median Titre (see text)

1. Slight variation in the antigen emulsion prepared on different days.
2. Effect of reinactivation on the specimens.

Study of Second Specimens

From 210 individuals we have received two specimens collected within one week. Within seven days we would seldom expect to see significant changes in titre of positivity except in progressing primary syphilis. An analysis of the agreement and disagreement of quantitative tests on these pairs of specimens from 210 individuals is presented in Table III. Exact agreement was obtained in 53.8 per cent. The percentage of specimens showing disagreement to the extent of one dilution or two dilutions is very similar to the results obtained with testing the same specimen on different days, as shown in Table II. From this we conclude that differences of one dilution on two specimens cannot be considered to indicate any significant change in titre of positivity, and in a small percentage of cases even two dilutions may be due to technical variations. In only one pair of specimens was there disagreement in excess of two dilutions. These specimens were from a case of primary syphilis (see Case D, Table VI). The first specimen was positive in dilution 1:8, the second, collected seven days later, was positive in dilution 1:64. A third specimen, received from this individual four months later, gave negative VDRL and Kolmer-Wassermann test results.

Comparison with the Quantitative Kahn

Quantitative Kahn tests and quantitative VDRL slide tests have been done on 628 specimens. In Table IV the number of specimens giving each grade of quantitative Kahn test result is shown, as well as the dilutions positive by the quantitative VDRL slide test. The median titre for the quantitative VDRL test is starred for each type of quantitative Kahn reaction except the five highest titres. Too few specimens fall into these groups to permit designating a median titre. The quantitative VDRL tests gave the median titre indicated or varied only one dilution in 91 per cent of the specimens. Only five specimens varied by more than two dilutions from the median titres indicated. Three of these five specimens were from the same individual and gave quantitative Kahn titres of 20 units, 10 units, and 2 units, respectively. The VDRL, Kolmer-Wassermann, and Hinton tests were all negative on these three specimens. This individual is not a reported case of syphilis, and these are probably false positive Kahns.

Table IV clearly indicates the greater sensitivity of the VDRL test as compared with the Kahn. The dilutions used for the quantitative Kahn are given to bring out this difference. For example, forty-five specimens gave quantitative Kahns of 40 units. These Kahn tests are positive in a serum dilution of 1:10. When these forty-five specimens were tested by the quantitative VDRL test, fourteen were positive in dilution 1:16, eighteen positive in dilution 1:32, twelve in dilution 1:64, and one in dilution 1:128. With the 153 specimens giving negative Kahn tests the VDRL test results were negative in seventy-six, weakly positive in forty, positive "undiluted only" in twenty-nine, positive diluted 1:2 in seven, and positive diluted 1:4 in one.

Taking into consideration the technical varia-

TABLE V. CORRELATION OF SPINAL FLUID TEST RESULTS WITH QUANTITATIVE VDRL SLIDE TEST RESULTS ON BLOODS FROM 168 KNOWN CASES OF SYPHILIS

Spinal Fluid	VDRL Slide Test Results on Blood											Total
	Neg	Wk Pos	Pos Undil. Only	Pos 1:2	Pos 1:4	Pos 1:8	Pos 1:16	Pos 1:32	Pos 1:64	Pos 1:128	Pos 1:256	
1. Kolmer and VDRL positive	1	2	5	7	10	10	7	8	7	1	4	62
2. Kolmer or VDRL test positive*	1	3	3	6	3	2	0	2	4	1	1	26
3. Kolmer and VDRL tests negative	1	3	8	13	23	12	6	6	4	4	0	80

*Kolmer positive, VDRL test negative on 9 specimens.
Kolmer negative, VDRL test positive on 7 specimens.
Kolmer positive, insufficient material for VDRL test on 10 specimens.

tions in test procedure in these two methods of quantitation, the correlation of the results is good. Quantitation by both procedures adds little, if any, significant information.*

Spinal Fluid Test Results Compared with VDRL Blood Test Results

Both spinal fluid and blood specimens have been tested on 168 known cases of syphilis. These results are presented in Table V classified into three groups according to the results on the spinal fluids: (1) Kolmer and VDRL tests both positive; (2) Kolmer or VDRL test positive; and (3) Kolmer and VDRL tests both negative. The quantitative VDRL tests on the blood serum show an equally wide range of titre in all three groups. In group 1 with both tests positive on the spinal fluid, 24 per cent of the blood specimens are positive diluted only 1:2 or show even weaker results. In group 2 with one test positive on the spinal fluid, 32 per cent of the bloods are positive diluted 1:2 or weaker.

Colloidal gold curves have also been done on the majority of these specimens. In group 1 the gold curves were positive on forty-one specimens (thirty-six gave "paretic" type curves) and negative on twenty. Nine positive colloidal gold curves were on spinals from the fifteen persons with low titre (1:2 or less) quantitative tests in the blood. In group 2, positive gold curves were obtained on ten spinal fluids (eight gave "paretic" type curves) and fifteen were negative. Four of the positive gold curves were on spinals from the thirteen persons with low titre (1:2 or less) quantitative tests in the blood. One specimen in group 1 and one in group 2 was insufficient for the gold curve. In the negative group (3) one positive gold curve was obtained; forty-eight gave negative gold curves. This test was not done on the thirty-one remaining specimens.†

The important point brought out by the data in Table V is that, if the blood serum shows only a low titre positivity, this is no assurance that the spinal fluid will be negative, nor is a high titre suggestive that the spinal fluid will be positive. Consequently the quantitation of positivity in blood serum is of no value in predicting the reaction in spinal fluids. Whenever indicated, spinal fluid should be examined regardless of the results on the blood.

Illustrative Cases

In Table VI are given the serologic findings on a few selected individuals. Additional data on these patients follow.

(A) This individual is not syphilitic. The diagnosis was infectious mononucleosis, which frequently gives false positive tests for syphilis. The heterophile antibody titre was positive in dilution 1:640 on the first blood specimen tabulated.

(B) This is not a case of syphilis. The individual was vaccinated for smallpox "shortly" before the collection of the first blood specimen. Several times each year we see false positives following smallpox vaccination, which on occasion show stronger positivity than Case B.

(C) Primary syphilis. Penicillin treatment given in the interval between the two blood specimens.

(D) Primary syphilis. Penicillin, neoarsphenamine, and bismuth administered between the second and third specimens.

*Quantitative Kahn tests have been done on special request in these laboratories. The quantitative Kahn test is to be discontinued after September 30, 1950. Both quantitative Kahns and VDRL slide tests will be done when the quantitative Kahn is requested during the transition period, July, August, and September, 1950, providing the volume of serum is sufficient. Two full vials will be necessary for the battery of tests (VDRL, Kolmer, Kahn, Hinton, and quantitative Kahn and VDRL).

†The colloidal gold test is done only on request and on those spinal fluid specimens showing a positive serological test for syphilis.

TABLE VI. ILLUSTRATIVE CASES

Patient	Lues	Days after 1st spec	Results on Serological Tests for Syphilis				
			VDRL	Quantitative VDRL	Kolmer	Standard Kahn	Hinton
A	No	0	Pos	1:2	Pos 4+		
		6	Pos	Undil. only	Dbt ±	Neg	Neg
B	No	0	Pos	1:2	Dbt 1+		
		3	Pos	Undil. only	Neg	Pos 3+	Pos 4+
		14	Pos	Undil. only	Neg	Pos 2+	Pos 3+
		34	Neg		Neg		
C	Primary	0	Pos	1:16	Neg	Pos 4+	Pos 4+
		68	W.P.		Neg	Neg	Neg
D	Primary	0	Pos	1:8	Pos 4+		
		7	Pos	1:64	Pos 4+	Pos 4+	Pos 4+
		143	Neg		Neg		
E	Secondary	0	Pos	1:128	Pos 4+		
		6	Pos	1:64	Pos 4+	Pos 4+	Pos 4+
		80	Pos	1:8	Dbt 1+	Pos 2+	Pos 2+
F	Early Latent	0	Pos	1:16	Pos 4+		
		18	Pos	1:8	Pos 4+		
F′	No	0	Pos	1:2	Pos 4+	Pos 3+	Dbt ±
		13	Pos	Undil. only	Pos 4+	Pos 2+	Dbt ±
		21	W.P.		Pos 4+	Neg	Neg
		40	W.P.		Pos 4+	Dbt ±	Dbt ±
		51	Neg		Pos 4+	Neg	Neg
		71	Neg		Neg	Neg	Neg
G	Early Latent	0	Pos	1:4	Dbt 1+	Pos 3+	Pos 4+
		43	Pos	1:2	Pos 4+	Pos 3+	Pos 4+
		127	Pos	1:2	Pos 4+	Pos 3+	Pos 3+
		189	Pos	1:2	Pos 2+	Pos 3+	Pos 4+
H	Cardio-vascular	0	Pos	1:2	Pos 4+		
		49	Pos	1:2	Pos 4+		
		60	Pos	1:2	Pos 4+		
		62	Insuff*		Pos 4+*		
I	Secondary With Relapse	0	Pos		Dbt ±		
		5	Pos		Dbt ±	Pos 3+	Pos 4+
		11	Pos		Pos 3+	Pos 4+	Pos 4+
		93	Neg		Neg	Neg	Neg
		160	Neg		Neg		
		279	Neg		Neg		
		366	Pos	1:2	Dbt 1+	Neg	Pos 3+
		476	Pos	1:32	Pos 4+	Pos 4+	Pos 4+
		494	Pos	1:32	Pos 4+	Pos 4+	Insuff.

*Spinal Fluid.

(E) Secondary syphilis. Source of infection to Case C above. Penicillin treatment given in the interval between the second and third specimens.

(F) Early latent syphilis. First specimen collected five days prior to delivery of infant. Syphilis diagnosed and treated two months prior to delivery.

(F′) Infant of Case F. One month old when first blood was submitted. According to our records, no treatment was administered to the infant, and the case has not been reported.

(G) Early latent syphilis was diagnosed in 1943. Irregular and inadequate treatment for several years. Adequate treatment regime in 1947 and 1948, completed nine months prior to the first specimen tabulated. Spinal fluid negative in 1947. No change in positivity in the seven-month period covered. This patient's blood will probably not become negative.

(H) Cardiovascular syphilis. Diagnosed and treated six years ago. Spinal fluid examination requested but not done at that time. Positive spinal fluid collected two days after the third blood specimen tabulated.

(I) Originally reported as secondary syphilis. Adequately treated with penicillin, arsenic and bismuth for eight months. Attending physician evaluates the later change as a relapse.

Discussion

Requesting repeat specimens (two full vials) on all diagnostic problems will be continued. The results on the Kahn and Hinton tests, in addition to the VDRL and Kolmer, will frequently aid in diagnosis or exclusion of syphilis. (See patients A and D in Table VI.)

There is no evidence establishing that the height of titre of any quantitative tests for syphilis correlates directly with clinical activity. The value of the quantitation is that the higher the titre is, the stronger the serological evidence is for supporting a diagnosis. In addition, the change in titre can be

noted during treatment which can, on occasion, give an earlier warning of relapse than would be possible with qualitative tests.

Referring to Table I, the greater incidence of anticomplementary Kolmer test results in very high titred specimens is apparent. It is well established that anticomplementary reactions occur frequently in specimens giving very high titred quantitative tests and in contaminated specimens. Also, blood serum from some individuals is anticomplementary because of unknown factors. Because bacterially contaminated specimens are associated with anticomplementary reactions, the quality of any anticomplementary specimen may be questioned. As a result, the two basic recommendations (1) that all positive blood tests be repeated before diagnosis and (2) that bloods be collected with sterile technique, both become even more important when considering an anticomplementary result.

When an anticomplementary result is reported and when serological results are for any reason questionable, it will frequently be necessary to submit several specimens over a period of months, and a spinal fluid, before a sound conclusion can be reached as to diagnosis or exclusion of syphilis.

As is readily understandable, we have no clinical data on a large percentage of patients in this study. We hope that none the less the data here presented will prove valuable. Quantitative VDRL tests have been reported to Dr. F. W. Lynch, Saint Paul, and he is presenting his evaluation of the procedure in this issue.[2]

Summary

Starting July 1, 1950, it is planned to report all positive VRDL slide test results quantitatively. Quantitation has the following advantages:

1. The higher the dilution in which the test is positive, the less is the possibility of a false positive.
2. Changes in titre can be followed during treatment. This is most important in early syphilis.

Limitations:

1. Regardless of the quantitation, all positive tests should be repeated. Two full vials of blood for the "battery of tests" are desirable on second specimens.
2. Variations of one dilution (first specimen positive diluted 1:4, second specimen positive diluted 1:8) have no significance, since such change can be due to several technical variations in the test procedure.
3. Strength of positivity as indicated by the dilution does not correlate with the clinical activity of the infection.
4. Spinal fluid examination should be made whenever indicated, regardless of the quantitative result, since over 25 per cent of patients with positive spinal fluids have low titre positive reactions in the blood (positive diluted 1:2 or weaker.)
5. Approximately 6 per cent of our specimens have been insufficient for quantitation. One full vial (6.0-7.0 c.c.) is requested.

The quantitative Kahn test (done only on special request) will be discontinued on October 1, 1950.

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FALL IN TUBERCULOSIS DEATH RATE

The annual death rate from tuberculosis dropped 10 per cent in 1948 to 30.0 per 100,000 population, Federal Security Administrator Oscar R. Ewing said today. He cited an article, "Tuberculosis Mortality in the U. S. 1948," which appears in the current Tuberculosis Control Issue of *Public Health Reports*, published by the Public Health Service, Federal Security Agency.

The decline in the tuberculosis mortality rate, the article points out, has accelerated during the postwar years. The rate dropped 5 per cent from 1945 to 1946, and 7 per cent from 1946 to 1947.

The tuberculosis death rate for the population as a whole has been steadily declining for the past twenty years, so that the 1948 rate was less than half the 1930 rate, according to the article. The decline is sharper in some sections of the population than in others—sharpest of all in children under fifteen years of age. In persons over sixty-five years of age, on the other hand, the decline has been slow, and indeed in white males over sixty-five the tuberculosis death rate was higher in 1948 than in 1941.

In general, the article points out, the tuberculosis death rates for women have fallen more rapidly than those for men. The 1948 rate for females was about half of that for males. Mortality rates from this disease continue to be more than three times as high for the nonwhite groups as for the white, the article says.

The state with the lowest tuberculosis death rate in 1948 was Iowa with a rate of 9.5 per 100,000 population. The state with the highest rate, Arizona, dropped from 100 in 1947 to 82.4 in 1948.—*Public Health Service* Release April 12, 1950.

THE CLINICAL APPLICATION OF QUANTITATIVE REPORTS OF SEROLOGIC TESTS FOR SYPHILIS

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SINCE the Serologic Laboratories of the Minnesota Department of Health will soon report quantitatively on reactions in serial dilutions of specimens tested with the VDRL antigen, this paper is presented in the hope of familiarizing Minnesota physicians with the expected advantages of such reports. Syphilis is not common in Minnesota but this fortunate fact does not lessen the need for offering these syphilitic patients the best possible care. The discussion is based on the results of studies on specimens submitted to the Minnesota Department of Health from private practice and from Ancker Hospital from October 1, 1949, to April 1, 1950, attempting to evaluate the limitation and advantages of such tests.* Capable clinicians may immediately ask whether these detailed reports may not encourage overdependence upon laboratory procedures and thereby diminish clinical acumen and effort. While this paper points out certain advantages to be gained from quantitative studies, the author wishes first to warn against too great dependence upon tests and his purpose is to assist in their cautious and correct application.

> *"The interpretation of serologic tests for syphilis is of paramount importance in the diagnosis of syphilis and the follow-up of treated patients."*
> EVAN W. THOMAS *in*
> *"Syphilis, Its Course and Management."*

The most clearly evident limitations of quantitative tests are:

1. Quantitative studies do *not* eliminate the possibility of technical or clerical errors and one must not depend on results obtained on a single specimen.
2. Serial dilution of serum does not increase the *specificity* of a serologic reaction.
3. There is no *dependable* relation between the amount of reagin and severity of syphilis or the need for treatment.

Specificity

The VDRL antigen has increased the specificity of serologic tests for syphilis and quantitative reporting† will increase diagnostic accuracy in some cases since reactions occurring at higher dilutions are more likely to be specific than those observed only in undiluted serum. Just as before, in doubtful cases the VDRL report must be correlated with others since the likelihood of a false reaction is increased when there is conflict (e.g., VDRL negative, Kolmer positive, or the reverse). Variations in intensity of reaction may be reported in a series of tests at intervals of one or several weeks. While slight variations may be of no significance,‡ greater ones suggest lack of specificity, and sustained upward trends are likely to be significant of increasing specific activity. Since time to observe the serologic *trend* may be of great help in diagnosis, it is fortunate that in the absence of clinical evidence or spinal fluid changes, there seldom is need for haste. The addition of quantitative study does not change the general principles that through physical examination, accurate personal and familial history, spinal fluid study, and patience are necessary for the accurate diagnosis of syphilis.

In this series diagnostic help from quantitation was obtained in several cases. Diagnosis had long been delayed in one case because of numerous variable and conflicting reports, but after several years a specimen was reported as 4-plus in all tests and VDRL positive in dilution of 1:8, and later at 1:16, the higher dilutions suggesting that the progressive serologic change had been great rather than slight in degree, as might have been suspected if the VDRL test had been reported only as positive.

In another instance a false diagnosis of syphilis may have been averted in the case of a penile lesion closely resembling a chancre. A series of tests was reported as follows:

Kline	2-plus	2-plus	4-plus
VDRL	pos.	pos. undiluted	pos. undiluted

Presented before the Minnesota Academy of Medicine, May 10, 1950, at St. Paul, Minnesota.

*This study was carried out with the generous co-operation of the Medical Laboratories of the Minnesota Department of Health, and consists of clinical observations relating to approximately 4 per cent of the positive serologic reactions studied in detail by Drs. Kimball and Bauer and reported in this issue of MINNESOTA MEDICINE.

†Details regarding the quantitative VDRL technic and method of reporting are discussed by Dr. Kimball.

‡Dr. Kimball's Tables II and III illustrate the variations to be expected in results on repeated testing of single specimens or on repeated specimens.

Too much importance was not placed upon the 4-plus report since the VDRL reaction occurred only in low titre. Only a few days later both tests reverted to negative. (Fortunately the Kolmer reaction had remained negative throughout the period of observation.)

In serial studies of several patients the VDRL reaction ranged from negative to positive in dilution of 1:2 in cases where other tests were reported negative to 4-plus, and no diagnosis of syphilis was made. Dr. Kimball's illustrative cases A and B further demonstrate these points.

Activity of Infection

Rising serologic titres must be appraised as possible evidence of early, untreated syphilis (acquired or congenital). Negative reactions occur during the first four or five weeks of infection, then follows a rather rapidly progressive rise in titre to a peak during the "secondary stage" of the disease, after which the serologic titre decreases and within a year or two becomes fairly stable, at levels which vary greatly from patient to patient and seem to have little or no relation to the severity of the disease. Though the serologic level is not directly related to the activity of the disease, negative serologic reactions are rare in *active* late syphilis. Clinical evidence of previously active inflammation may or may not be accompanied by serologic activity (e.g., cutaneous or osseous scars or inactive—"burned-out"—tabes with residual neurologic changes).

The following examples from this series show how undependable is the titre as an indicator of activity of infection and need for treatment:

Titre	*Nature of the Syphilis*
1:128	old, previously treated for cutaneous gumma.
1:64	old, previously treated slightly
1:64	old, untreated, cardiovascular syphilis.
1:32	late, active cutaneous syphilis.
1:16	late, active neurosyphilis.
1:8	late, persistent spinal fluid changes, recently re-treated.
1:2	late, treated, seroresistance in spinal fluid.
undil.	active interstitial keratitis.

Such examples clearly illustrate that quantitative reports must not be used as direct indications of the necessity for, or the character or amount of, treatment. The data presented by Dr. Kimball in Table 5 (and her Case H) clearly shows a lack of positive correlation between the degree and activity of neurosyphilis (as shown by spinal fluid changes) and the degree of reaction to the VDRL test.

Response to Treatment

The greatest advantage of quantitative serologic study is in the evaluation of results of modern, rapid, intensive therapy for early syphilis. Here one expects a rapid, progressive drop in titre to negativity in one to four months. (When treatment has been instituted before serologic reactions have become positive, or while they are still increasing in intensity, there may be a transitory rise immediately after starting to treat—a "serologic Herxheimer reaction"). Even when treatment has been started as early as one or two months after infection, one will observe some patients whose serologic response progresses steadily to a point just above negativity (e.g., weak positive, or positive undiluted only, or in dilution of 1:2) and then persists at that level, fluctuates slightly, or diminishes very slowly. Treatment has not failed; these patients have had adequate therapy and need not be re-treated. After treatment of early syphilis the blood should be tested monthly for a year, every two or three months the second year and semi-annually thereafter. The spinal fluid must be examined six to twelve months after completion of treatment, and abnormal changes require immediate therapeutic attention.

In this series a serologic Herxheimer reaction was noted in a patient with late congenital syphilis with doubtful serologic reactions, given penicillin therapy because of interstitial keratitis. Before treatment, on two occasions the Kolmer reaction was negative and the VDRL positive undiluted only, but following treatment the Kolmer reaction was doubtful 1 plus-minus and the VDRL positive when diluted 1:2.

In other instances the serologic reaction became less intense following treatment. A woman treated late in pregnancy gave birth to an infant who later developed evidence of osseous syphilis, and serologic reactions of Kline 4-plus, Kolmer 4-plus, VDRL positive in dilution of 1:2. Penicillin therapy was begun five weeks after birth and all the serologic reactions were completely negative three months later. Dr. Kimball's cases C.D. and E. illustrate similar response to treatment.

After rapid intensive treatment for early syphilis seroresistance at relatively high levels is rare (e.g., dilutions of 1:8 or greater). When

there is no clinical evidence of active inflammation and the spinal fluid is normal, the significance of such seroresistance is questionable. Perhaps there may be small foci of slowly progressive infection or equally possibly the high level of antigen represents a favorable degree of immunity. At any rate there is little risk if such patients are re-treated after six months and then closely observed but given no therapy thereafter, unless the titre rises further.

The greatest benefit of quantitative tests is the early demonstration of serorelapse or re-infection (illustrated by Dr. Kimball's Case I). Serologically the two are indistinguishable. It must be emphasized that such setbacks are proved only when noted on two or more tests and never on a rise of serologic titre demonstrated on a single specimen. Clinically, the chancre of reinfection *precedes* the rise in titre while the mucocutaneous infectious relapse *follows* serorelapse. Frequently, it is important to distinguish the sequence and this can hardly be done without a series of tests with quantitative reports.

Early latent syphilis may respond less rapidly as in the patient whose reactions at start of therapy were Kline 4-plus, Kolmer 4-plus, VDRL positive 1:16 and were the same one month later. At four months the Kline and Kolmer remained 4-plus, but the VDRL was positive only in 1:8 dilution, offering evidence of some favorable effect from the treatment (See also Dr. Kimball's case F.)

In a patient with previously treated asymptomatic neurosyphilis the giving of penicillin failed to modify a VDRL positive reaction at 1:8 dilution. However, in clinically progressively active neurosyphilis similar treatment was followed by a change from VDRL positive at 1:16 to positive only when undiluted. (The Kolmer reaction remained 4-plus and the Kline changed from 4-plus to 3-plus).

Conclusions

Serologic study is increasingly important in syphilis, with quantitative reports offering certain advantages, which have been illustrated by examples selected from reports on a recently observed series of patients.

1. With reference to the recognition of false reactions, positivity in higher dilutions increases the likelihood that the reaction is specific.

2. Steadily rising titres may be demonstrated in early, acquired syphilis and in early, congenital syphilis (regardless of whether treatment was given the mother during pregnancy).

3. Transitory increase in titer may be found immediately after the institution of treatment (serologic Herxheimer reaction).

4. Falling titres are expected as a result of treatment, especially after modern intensive treatment for early syphilis. The most significant application of quantitative reports occurs in early syphilis with an initially favorable serologic response to treatment but later showing progressive increases in titre (serorelapse). Recognition of this serologic change allows institution of retreatment before clinical, infectious relapse exerts its disastrous influences on patient, family or other persons.

5. Quantitative reports are of considerably less significance in all other circumstances and the clinician must not base decisions on insignificant changes. It must be particularly remembered, for example, that positive in 1:64 dilution does not mean "twice as much syphilis" as in 1:32 dilution, but only that one more dilution of the serum allowed demonstration of a positive reaction which may have been due to technical error, extrinsic changes after collection of the serum, or normal and natural variation in the serum content of syphilitic reagin, without significance on the ultimate course of the disease.

6. It may be pertinent to point out a sequence not observed in this series. When gonorrhea and syphilis are acquired simultaneously, the former is often treated by penicillin before the latter is serologically or clinically demonstrable. The syphilitic infection may be aborted, masked or delayed in its appearance but frequently repeated serologic tests will aid in its early recognition and rising quantitative titers have obvious significance.

Health education and sanatorium treatment are our two greatest weapons in fighting tuberculosis. We must remember that each patient with active tuberculosis presents a medical problem, a social and welfare problem, an economic problem and, let us never forget, a public health problem.—R. D. JOHNSON, M.D., *Bull. Nat. Tuber. A.*, Jan., 1950.

PROGRESS IN MATERNAL AND INFANT HEALTH IN MINNESOTA
A Statistical Study of the Decade 1939-1949

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Maternal Mortality

NATIONALLY, during the past decade the maternal mortality rate has dropped from 4 per 1,000 live births in 1939 to approximately 1 per 1,000 in 1949, a reduction of 75 per cent. In Minnesota the 1939 maternal mortality rate of 2.7 decreased to 0.7 per 1,000 live births in 1949, a similar reduction of 74 per cent. This period included the war years with their rising birth rates and reduced medical and nursing personnel. During the past five years, 1945-1949 inclusive, there was a reduction of 50 per cent, from 1.4 to 0.7 per 1,000 live births.

In 1947, at the peak of our birth rate (75,468 live births), Minnesota's mortality rate dropped to a new United States low of 0.6 per 1,000 live births. While we may well be proud of this accomplishment, which appears to have brought us to an almost irreducible minimum, it is apparent that a still greater reduction is possible when we consider that Oregon reduced its rate to a new national low of 0.4 per 1,000 live births in 1948.

The possibility of further reduction in maternal mortality is also indicated by a preliminary study of the recent EMIC program in Minnesota. During the four full years of the program, 1944-1947, a total of 18,457 live births occurred, with a maternal mortality rate of 0.7 per 1,000 live births. During this same period, 232,207 live births occurred in Minnesota outside the program, with a mortality rate of 1.1 per 1,000 live births, a very significant difference of 36 per cent. It should be noted, however, that the live births in the EMIC program constituted only 7 per cent of the total live births in the state during the four years mentioned. No data are available in our records as to parity of the mother. A preponderance of mothers were, however, in the safest age group of fifteen through twenty-nine years (88 per cent in contrast to the usual state proportion of only about 68 per cent), and the group was a more favored one economically, since medical and hospital care were provided for the asking. Nevertheless, the value of adequate and competent prenatal care, good obstetrical and postpartum care, hospitalization, consultation, and the use of blood and antibiotics, as well as public health programs, cannot be overlooked.

Because of the small number of maternal deaths in each county, there may be quite marked variations in rates from year to year. For this reason, maps were prepared for five-year periods. Map 1 includes all maternal deaths from 1935 through 1939, by counties. Map 2 includes deaths for 1945 through 1949. These maps show five years of recorded maternal deaths rather than the usual resident figures, in order to allocate deaths to the county of occurrence rather than the county where the prospective mother was given prenatal care. It is realized that this approach may influence rates adversely in some counties, but it may also indicate the areas where periodic study of their own maternal problems may be of value to communities in reducing preventable deaths. A comparison between maps 1 and 2 provides a graphic presentation of the improvement in maternal mortality during the period covered.

The state maternal death rate for the five-year period 1935-1939 was 3.5 per 1,000 live births. Twenty counties had rates less than 2.0; forty-three had rates between 2.0 and 4.0; twenty-four had rates over 4.0. Ten years later, in the five-year period of 1945-1949, rates were strikingly lower. The state maternal deaths rate was 0.85 per 1,000 live births. Eighty-one counties had rates less than 2.0; only five had rates between 2.0 and 3.9; only one county had a rate of 4.0 (5.3. to be exact).

The chief causes of maternal deaths are infection, toxemia, and hemorrhage. Table I shows the changes in percentage of deaths due to these causes during the ten-year interval under discussion.

In 1939, thirty-two (24 per cent) of the 136 maternal deaths were due to infection; twenty-six (19 per cent) to toxemia and a similar number to hemorrhage; and fifty-two (38 per cent) to other causes. In 1949, fifteen of the fifty-four maternal

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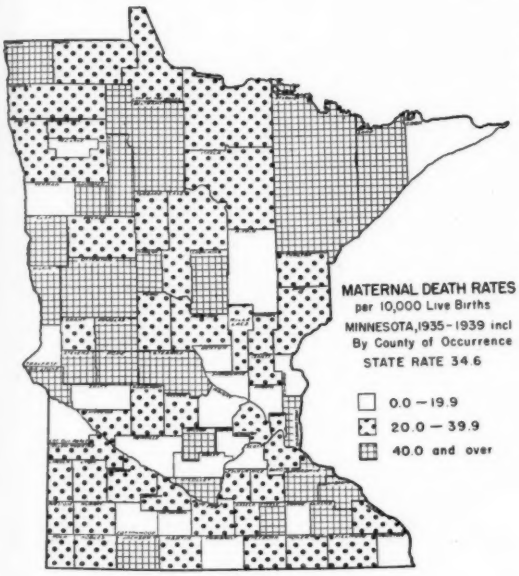
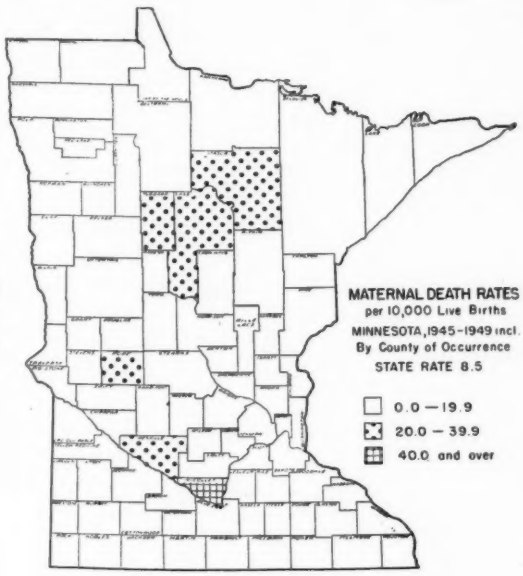
deaths were due to infection (28 per cent), an increase of 4 per cent over the 1939 figures. Toxemia caused eleven deaths (20 per cent); hemorrhage was responsible for ten deaths (18.5 per cent); and eighteen (33 per cent) were due to other causes. From 1939 to 1949, there was a 74 per cent reduction in all causes; death from infection decreased 65 per cent; the other causes of maternal deaths decreased approximately 75 per cent.



Map 1.



Map 2.

TABLE I. MATERNAL DEATHS BY CAUSES AND PER CENT OF CHANGE PER 10,000 LIVE BIRTHS

Minnesota, 1949 and 1939

Causes	Number		Rates		Per Cent of Change
	1949	1939	1949	1939	
All causes	54	136	7.0	27.0	–74
Infection	15	32	2.0	6.3	–65
Toxemia	11	26	1.4	5.2	–73
Hemorrhage	10	26	1.3	5.2	–75
All others	18	52	2.3	10.3	–78

The decrease in mortality for the three main causes of maternal deaths has undoubtedly been due to a number of interrelated factors. These include better obstetrical practice, more extensive and more adequate prenatal care, early transfusions, sulfonamides and antibiotics, increased hospitalization (more than 97 per cent in Minnesota), improved hospitalization facilities, and an increasing awareness by the public of the importance of adequate care, which has been promoted through public health education.

During the period from July 1, 1941 through June 30, 1942, the maternal mortality committee of the Minnesota State Medical Association in co-operation with the Minnesota Department of Health conducted an intensive study of the 112 maternal deaths that occurred in that period. In its report the committee pointed out the extent to which the physician was responsible for maternal deaths, as well as the importance of adequate prenatal care. It is felt that the study was a significant factor in the subsequent reduction of maternal mortality in this state. The Council of the Minnesota State Medical Association has approved a similar study by its maternal health committee for the year of 1950 in an effort to reduce maternal mortality still further.

The largest number of births occurred in the age groups twenty to twenty-four and twenty-five to twenty-nine. These made up 59 per cent of the total in 1939 and 61 per cent of the 1947 total (Table II). Risks in childbearing were low-

TABLE II. MATERNAL MORTALITY BY AGE GROUPS
Minnesota, 1947 and 1939

Age at Death	Live Births		Maternal Deaths		Rates per 10,000 Live Births		Per Cent of Change
	1947*	1939	1947	1939	1947	1939	
TOTAL	75,577	50,237	47	136	6.0	27.0	—78
10-14 yrs.	25	13					
15-19 "	5,325	3,876	1	7	1.9	18.1	—89
20-24 "	23,662	15,107	11	20	4.7	13.2	—64
25-29 "	22,444	14,446	9	32	4.0	22.1	—82
30-34 "	14,480	9,541	3	31	2.1	32.5	—66
35-39 "	7,373	5,255	16	28	21.7	53.3	—59
40-44 "	2,044	1,832	7	15	34.2	81.9	—58
45-49 "	127	158	0	3	...	189.9	—100
50 and Over	15	3					
Not Stated	82	6					

*Maternal age groups for 1948 and 1949 are not yet available.

TABLE III. LIVE BIRTHS, INFANT DEATHS, AND STILLBIRTHS
Minnesota, 1949 and 1939

	Number		Per Cent of Change	Rate per 1,000 l.b.		Per Cent of Change
	1949	1939		1949	1939	
Live Births	73,627	50,237	+47			
Infant Deaths	1,922	1,798	+7	26.1	35.8	—27
Stillbirths	1,215	1,217	0	16.4	24.2	—32

TABLE IV. TOTAL MINNESOTA AND INDIAN LIVE BIRTHS AND INFANT DEATHS
Minnesota, 1939 and 1949

Year	Live Births		Infant Deaths			
	Minnesota	Indian	Minnesota		Indian	
	No.	No.	No.	Rate/1,000 l.b.	No.	Rate/1,000 l.b.
1939	50,228	537	1,798	35.8	22	41.4
1949	73,627	574	1,922	26.1	32	55.7

est in the age group twenty to twenty-four in 1939 with a mortality rate of 13.2 per 10,000 live births. For mothers fifteen to nineteen years old and twenty-five to twenty-nine years old the death rates were below those for all ages. Among mothers thirty years of age and over these rates increased in each succeeding age group, with a peak of 189.9 per 10,000 live births among mothers in the forty-five to forty-nine year group.

In 1947 the entire group of mothers aged fifteen to thirty-four years had a mortality rate of 4.7 or less, with a marked rise in the thirty-five to forty-four year group. The highest mortality occurred in the forty to forty-four year group (34.2 per 10,000). The lowest rate of 1.9 was in the fifteen to nineteen year age group. In the thirty to thirty-four year age group it was 2.1 per 10,000 live births. A comparison of maternal deaths in 1939 and 1947 shows that the greatest reduction took place in the fifteen to nineteen age group, where there was a decrease of 89 per cent. In the twenty-five to twenty-nine year age group the reduction was 82 per cent. A 66 per cent decrease occurred in the thirty to thirty-four year age group and a 64 per cent drop in the twenty to twenty-four year group. There was a 59 per cent decrease in the thirty-five to thirty-nine year group and a 57 per cent decrease in the forty to forty-four year group. No deaths occurred between forty-five and fifty years, although this group had the highest mortality rate in 1939. Interestingly enough, the safest childbearing age groups were fifteen to nineteen and thirty to thirty-four in 1947 instead of the usual twenty to twenty-four year age group.

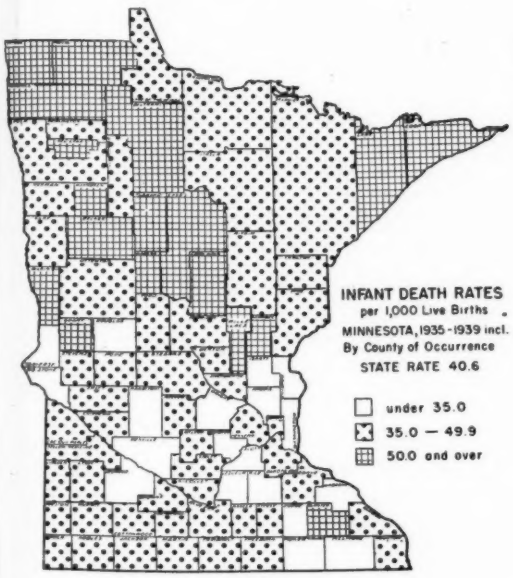
Infant Mortality

(Deaths Under One Year of Age)

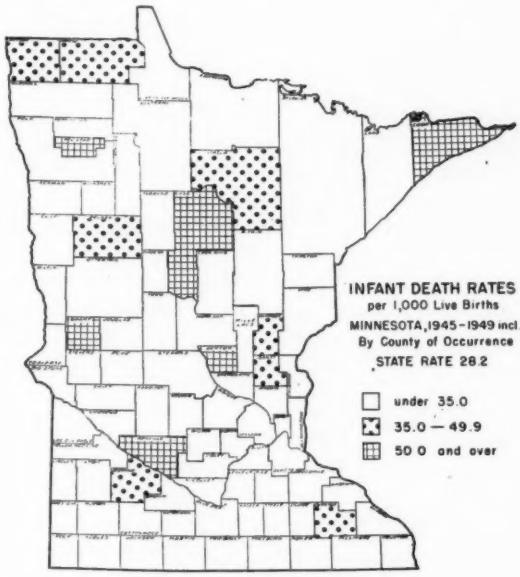
In 1939, a total of 1,798 infants died before reaching their first birthday. In 1949, the number increased to 1,922. But this 7 per cent increase in deaths was accompanied by a 47 per cent increase in live births during the decade. The infant mortality rate, however, decreased from 35.8 to 26.1 per 1,000 live births—a reduction of 27 per cent (Table III). Incidentally, infant deaths (under one year of age) constitute from 70 to 75 per cent of all deaths under the age of fifteen in Minnesota. The number of stillbirths has remained about the same, but there has been a substantial reduction in the rate from 24.2 per 1,000 live births in 1939 to 16.4 in 1949, a 32 per cent de-

crease. The stillbirth rate has actually decreased 5 per cent more than the infant mortality rate.

A comparison of infant death rates by county of occurrence during 1935-1939 (Map 3) with the rates for 1945-1949 (Map 4) graphically illustrates the reduction in infant mortality during this decade. In the five-year period 1935-1939, the state rate was 40.6 per 1,000 live births. Nineteen counties had rates below thirty-five. Fifty-two had rates between thirty-five and fifty; sixteen had rates of fifty and over. Ten years later, during the period 1945-1949, the state rate decreased to 28.2. Seventy-three counties had rates less than thirty-five; eight counties had rates between thirty-five and 49.9; and only six had rates of fifty and over per 1,000 live births.



Map 3.



Map 4.

The non-white population in Minnesota constitutes less than 1 per cent of the total state population. There are approximately 14,000 Indians, constituting about 0.5 per cent of the population, a small number of Negroes, and comparatively few Mexicans, Chinese, and Japanese. The 1949 infant death rate among our Indians was more than twice as great as the overall state rate—55.7 in contrast with 26.1 per 1,000 live births (Table IV). The Indian rate increased more than one-third in 1949 over that of 1939. The high incidence of communicable disease among the Indians undoubtedly influences the infant death rate materially. Another factor is prematurity. While prematurity was the eighth leading cause of death in Minnesota in 1949, it was the sixth leading cause among the Indians.

It should be pointed out that the rates in the Indian group are less stable, since they are based on a relatively small number of mothers. Since the Indian population constitutes less than 0.5 per cent of the state population, such rates have no real significance and do not materially increase the state rate. There are, however, serious health problems in the Indian population.

The causes of infant deaths in 1939 and 1949 are shown in Table V. The four leading causes of death constituted over 75 per cent of all deaths during the first year of life in both 1949 and 1939. The leading cause was premature birth, which was responsible for more than one-third of all deaths in both 1949 (37.4 per cent) and 1939 (35.7 per cent). Congenital malformations were responsible for almost one-fifth of all deaths in infancy (19.4 per cent) in 1949, and one in every twelve deaths in 1939 (12.7 per cent). The third leading cause of death was birth injuries, and pneumonia and influenza were fourth.

The relative importance of the causes of death and the percentage of change during the past ten years is brought out more clearly when it is related to the number of live births. This is the

TABLE V. CAUSES OF DEATH IN THE FIRST YEAR OF LIFE
Minnesota, 1949 and 1939

Cause of Death	Deaths in the first year of life: Number 1949	Number 1939	Rate /1,000 l.b. 1949	Rate /1,000 l.b. 1939	% Distribution 1949	% Distribution 1939
All Causes	1,922	1,798	26.1	35.8	100.0%	100.0%
Premature birth	718	640	9.8	12.7	37.4	35.6
Congenital malformations	372	229	5.1	4.6	19.4	12.7
Birth injuries	245	259	3.3	5.2	12.7	14.4
Pneumonia and influenza	189	223	2.5	4.4	9.8	12.4
Congenital debility and other disorders of early life	169	127	2.3	2.5	8.8	7.1
External causes	65	35	0.9	0.7	3.4	1.9
Diarrhea and enteritis	51	70	0.7	1.4	2.6	3.9
Acute infectious diseases	5	18	0.07	0.4	0.3	1.0
Other causes	108	197	..	..	5.6	11.0

TABLE VI. INFANT, NEONATAL AND ONE MONTH-ONE YEAR MORTALITY
Minnesota, 1949 and 1939

	Number 1949	Number 1939	Rate per 1,000 l.b. 1949	Rate per 1,000 l.b. 1939	Per Cent of Change
Infant deaths	1,922	1,798	26.1	35.8	—27
Neonatal deaths	1,440	1,258	19.5	25.0	—22
1 mo.-1 yr.	482	542	6.6	10.8	—39

TABLE VII. DEATHS UNDER ONE YEAR BY AGE PERIODS WITH PERCENTAGE OF DISTRIBUTION
Minnesota, 1949 and 1939

Age at death	1949	1939	% Change
Under 1 day	37.1%	38.7%	—4
1 day to 1 week	28.7%	21.7%	+32
1 week to 1 month	9.1%	9.5%	—4
Under 1 month	74.9%	69.9%	+7
1 month to 1 year	25.1%	30.1%	—16

TABLE VIII. NEONATAL DEATHS FOR SELECTED CAUSES BY PERCENTAGE OF DISTRIBUTION
Minnesota, 1949 and 1939

Total	Deaths 1949	Deaths 1939	Per Cent of Distribution 1949	Per Cent of Distribution 1939
	1,440	1,258	100.0%	100.0%
Prematurity	707	625	49.1	49.7
Congenital malfor.	245	143	17.0	11.4
Birth injuries	242	257	16.8	20.4
Cong. debility and other diseases of early infancy	156	112	10.8	8.9
Pneumonia & influ.	40	46	2.8	3.6
Diarrhea & enteritis	15	8	1.0	0.6
External causes	14	16	1.0	1.3
Other causes	21	51	1.5	4.1

comparison of the death rate for selected causes per 1,000 live births. The 1939 death rate of 12.7 per 1,000 live births for premature births, the leading cause of death, decreased to 9.8, a reduction of 23 per cent. The rate for congenital malformation, the second leading cause, increased 11 per cent. It was the tenth leading cause of death in both 1948 and 1949. The relationship of German measles in the first trimester of pregnancy to the development of congenital malformations deserves serious consideration. A preliminary study of mortality in Minnesota due to congenital malformations, however, has shown no significant variation in relation to the incidence of German measles.

Deaths from injury at birth, the third leading cause, decreased 37 per cent. This fact would indicate better trained physicians and more competent obstetrical care. Pneumonia and influenza, the fourth leading cause of death, were responsible for 43 per cent fewer deaths. This reduction was due, no doubt, to the use of sulfonamides and antibiotics. Among other relatively less important causes of infant mortality, diarrhea and enteritis showed a reduction of 50 per cent, and deaths due to acute infectious diseases showed an even greater reduction of over 80 per cent. On the other hand, accidental deaths in this early age group increased 29 per cent in the past decade.

The greatest mortality occurs during the first thirty days of life—the so-called neonatal period—and this period shows the least reduction from 1939 to 1949. The infant mortality rate in that period decreased 27 per cent, the neonatal mortality decreased 22 per cent, but the rate for the age group from one month to one year decreased 39 per cent, almost double the neonatal rate reduction (Table VI). It is in the neonatal period that our serious problem lies. Incidentally, there are as many stillbirths as there are neonatal deaths. This is another problem of great concern and is closely associated with neonatal mortality.

TABLE IX. PERCENTAGE DISTRIBUTION OF INFANT DEATHS BY CAUSES
Minnesota, 1949 and 1939

	Prematurity		Other prenatal and natal causes		All Others	
	1949	1939	1949	1939	1949	1939
Under 1 Year	37.4	35.6	40.9	34.2	21.7	30.2
Under 1 Month	49.0	50.6	33.3	31.4	17.7	18.0
Under 1 Week	53.0	54.4	32.6	33.0	14.4	12.6
Under 1 Day	57.7	62.3	32.5	29.3	9.8	8.4

In 1939, 70 per cent of all infant deaths occurred during the neonatal period, with more than half this number occurring under one day of life (38.7 per cent). A total of 21.7 per cent died between one day and one week, and 9.5 per cent died between one week and one month (Table VII). In 1949, there was an increase in the deaths during the neonatal period to 75 per cent with a marked increase occurring in the age group one day to one week. These deaths were due chiefly to prematurity. Only 25 per cent of all infant deaths occurred between one month and one year but this age group showed the greatest reduction.

The chief causes of neonatal deaths are the same as the infant deaths except that prematurity is now responsible for one-half instead of only one-third of all deaths during the first thirty days of life, both in 1949 and 1939 (Table VIII). Congenital malformations and birth injuries make up one-third of the deaths in this period, with an increase in malformations but a decrease in birth injuries in 1949.

The percentage of deaths due to prematurity and other prenatal and natal causes increases progressively from those occurring in the group "under one year" (78.3 per cent) in 1949 (Table IX) to the highest percentage in the group "under one day" (90.2 per cent). A similar progressive increase occurred in 1939.

A Program for Further Reduction of Maternal and Infant Deaths

1. Further reduction in maternal mortality requires:
   (a.) Continued emphasis on competent obstetrical care.
   (b.) More extensive and more adequate prenatal care which must include good nutrition practices.
   (c.) Modern hospital facilities with adequately trained personnel.
   (d.) Periodic surveys of maternal mortality to determine causes of, and responsibility for, such deaths. These findings will be utilized by medical societies, hospital staffs, and teaching institutions for undergraduate and postgraduate instruction in the further reduction of preventable maternal deaths.
2. A consideration of infant mortality leads to one of the most important problems in preventive medicine; namely, a reduction in the number of deaths during the prenatal and neonatal periods which, of course, include stillbirths.
   (a.) A study of infant deaths, perhaps limited to the neonatal period, similar to the survey now being carried out on maternal mortality by the State Medical Association, may be helpful in reducing infant mortality by emphasizing the problems requiring more concerted attention.
   (b.) Consideration of the problems of prematurity in developing a statewide program to reduce the mortality from this leading cause of infant deaths.
   (c.) Study of the relationship of viral diseases and various dietary factors during pregnancy; improved surgical skill and pediatric care to a possible reduction in mortality due to congenital malformations.
   (d.) Decrease in birth injuries by competent obstetrical care.
   (e.) Increased use of the newer antibiotics in pneumonia.
   (f.) Refresher courses in obstetrics and pediatrics at the Center for Continuation Study and/or regional seminars.
   (g.) Modern hospital facilities in rural areas, adequate pediatric nursing, con-

(Continued on Page 651)

SOLITARY PYOGENIC LIVER ABSCESS

Review of Literature and Report of Case

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and

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ABSCESSES of the liver may be classified into two main groups: (1) amoebic, which are usually single and which are associated with intestinal amebiasis, and (2) pyogenic. The latter are single or multiple and are usually due to: (1) infection in areas drained by the portal system; (2) spread from contiguous structures, e.g., acute cholecystitis, gastric or duodenal ulceration, or subphrenic space infection; (3) trauma by penetration from without or by infection in a hematoma with organisms already present in the liver; and (4) blood-borne infections via the hepatic arteries.

Some authors make no attempt to separate multiple from single liver abscesses but most feel that such a distinction is important, mainly on the basis of the prognosis and the therapy of this condition. Rothenberg and Linder, in reporting twenty-four cases of solitary pyogenic abscesses, expressed the conviction that the single liver abscess is most often of unknown or doubtful etiology, usually cannot be proven of portal vein origin, and only rarely is associated with pylephlebitis or portal vein thrombosis.

Some authors such as Ochsner, DeBakey and Murray do not separate pyogenic abscesses into two such groups in their analysis of forty-seven personal and 139 collected cases of pyogenic abscess of the liver. Yet they do state that from the prognostic and therapeutic standpoints it is important to make this differentiation if possible.

It is also extremely important to differentiate if possible the pyogenic hepatic abscess from amebic abscess, especially before the amebic abscess becomes secondarily infected. After such secondary infection has occurred, the clinical picture, the prognostic and therapeutic implications become similar to those of the pyogenic abscess.

Bacteriology

In the majority of the non-amebic abscesses the most commonly found organisms are the streptococci, staphylococci and bacillus coli, although almost every type of bacteria has been found in isolated instances. In almost half of the reported cases the pus has been sterile. Blood cultures in pyogenic abscesses are usually sterile.

Pathogenesis

The mode of origin of a solitary abscess in the liver according to most authors is considered to be a blood or lymph stream infection, probably by way of the hepatic artery from a focus such as an upper respiratory infection, carbuncle, influenza, et cetera. In Rothenberg and Linder's cases such a condition accounted for about one half of the individuals. In the other half no etiologic factors could be determined. In only two of their twenty-four cases was a portal vein or bile duct infection responsible. In other words the process is comparable to that of the production of a carbuncle of the kidney or osteomyelitis. Practically all these solitary abscesses occur in the right lobe and most of them involve the dome of the liver.

In multiple abscesses of the liver, the etiological process is one of suppuration in the portal system or biliary system such as suppurative appendicitis or cholecystitis, chronic ulcerative colitis, et cetera. In other words, the infection reaches the liver through the portal blood stream.

Diagnosis

Usually in the case of solitary pyogenic abscess of the liver there is a history of two to four weeks duration, with fever and occasional chills. Malaise and asthenia are pronounced. Indefinite, dull pain in the right lower thoracic region or right upper abdominal quadrant frequently gives the first hint of localization of the pathologic process. Localized intercostal pain is quite often present. Liver tenderness is usual, either on deep pressure with a single finger in an intercoastal space, or on palpation of the edge of the frequently enlarged liver, below the costal margin. This pain is usually directly over the abscessed area, and is non-radiating and constant. It may be dull or sharp, but rarely is it necessary to use heavy percussion to elicit this tenderness. Rapid loss of weight and

Presented before the Minneapolis Surgical Society, March 2, 1950.

strength are prominent features, but interestingly, nausea and vomiting are present in only a small percentage of cases. As a matter of fact, nausea and vomiting are a rather rare accompaniment of this disease, and this is of special significance since so few surgical abdominal conditions lack this symptom. Therefore, this absence of nausea and vomiting is an important diagnostic feature. The liver is usually enlarged; a few cases have a palpable right upper abdominal mass; some spasticity of the rectus muscle on the right is usually noted, but is not marked. Limited expansion of the right chest is occasionally seen, and an elevated, fixed diaphragm seen on fluoroscopy is the rule. Other pulmonary signs present are râles at the right base and a small right pleural effusion. Rarely, a palpably enlarged spleen is found. Usually no evidence of ascites is noted. A leukocytosis of 16,000 to 28,000 is the rule and the neutrophiles may average 86 per cent.

In multiple liver abscesses, the symptoms, as one would expect, are more severe as a rule than those in which there is a solitary abscess. The fever is higher and more spiking, jaundice is more common, the liver is larger, and tenderness and spasm of the overlying muscles is greater. The diagnosis in this type can usually be made on the history of a preceding infection in the intestinal tract, whereby the offending organisms have opportunity to reach the liver via the portal or biliary system.

The amebic abscess can usually be distinguished by the previous history and findings of the ameba. In this disease the liver abscess (which occurs in 4 to 5 per cent of individuals with amebiasis in this country) has a characteristically slow onset over months or years, and there is present a minimum of constitutional reaction such as chills, fever and pain. It is true that in many cases the Endamoeba histolytica cannot be demonstrated, yet the history, a trial on antiamebic therapy, and other features of the disease will differentiate this condition from the other types of liver abscess, single or multiple. Of course after an amebic abscess becomes secondarily infected, it must be regarded as a pyogenic one.

Liver abscess must be differentiated from cholecystitis, subphrenic abscess, suppurative lesions of the right kidney and early pneumonia. Disease of the gall bladder can usually but not always be differentiated by a carefully taken history. Previous attacks of pain, intolerance of fatty foods, jaundice and difference in location and the type of pain and tenderness are usually of great help. The pain in liver abscess is steady and directly over the liver substance and not over the gall-bladder area. That in gall-bladder disease is intermittent, radiates to the back and is unbearable. Of course in acute cholecystitis the differential diagnosis is confusing although the enlarged gall bladder can usually be palpated as a tender mass. Subphrenic abscess tends to produce pain on deep inspiration, it usually radiates to the scapular region, and is frequently preceded by an infection within the abdomen. X-ray findings of pus beneath the diaphragm should make the diagnosis. However, when there is an abscess that points to the right dome of the liver, the diagnosis may be difficult. Suppurative lesions of the kidney may be difficult to differentiate from those cases in which the liver abscess involves the lower portions of the right lobe of the liver, because of the pain produced in the right loin. However urinary findings will be of assistance in this differentiation. Early pneumonia may give rise to pain in the right lower chest, fever and chills, but with rapid development of roentgenologic signs in the lungs, and the absence of enlarged liver, et cetera, one may usually differentiate the two conditions. In the differential diagnosis of liver abscess one should always remember that nausea and vomiting are most frequently absent probably because of the lack of peritoneal irritation. In practically all other surgical conditions of the abdomen this symptom is present. Constipation and diarrhea are also almost always absent.

Complications

Since most of these abscesses are on the dome of the liver, the infective process is likely to advance upward and involve the pleura or lungs. Consequently pleurisy with effusion, empyema and even rupture into the lung itself may occur. If the spread is downward the abscess ruptures into the peritoneal cavity. The resulting peritonitis is especially dangerous and the condition then presents the picture of a major abdominal catastrophe.

Prognosis

This varies of course with the location of the lesion, its early recognition, the type of organism responsible, and the multiplicity of the abscesses present. If removal of the pus is not carried out, the mortality rate is 100 per cent. In large series

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of cases, various authors report all the way from 37.5 to 60 per cent mortality. With the advent of antibiotics it can reasonably be expected that great improvement in results will be achieved. No large series of cases has been reported since these drugs have been used.

Treatment

The classical treatment of solitary pyogenic abscess is incision and drainage. It is repeatedly emphasized in the literature and considered highly important that contamination of either the peritoneal or pleural cavities be carefully avoided, since it has been shown that the mortality rate rises sharply whenever this occurs. If there is evidence of localization of the abscess in the anterior or antero-inferior surface of the liver, the technique described by Clairmont may be used. Briefly, this consists of using a subcostal incision, with mobilization of the parietal peritoneum from the lower surface of the diaphragm, when drainage of the abscess can usually be done extraperitoneally. If it cannot, adherence to the visceral and parietal peritoneum should be induced by packing with iodoform or other gauze, and drainage done through this area at a subsequent stage, two to three days later.

If there is no evidence of localization anteriorly, the retroperitoneal approach described by Ochsner may be employed. The twelfth rib is resected subperiosteally. A transverse incision is made through the bed of the resected rib at the level of the spinous process of the first lumbar vertebra. The reason for this is that the pleura never extends below the level of the spinous process of the first lumbar vertebra. The retroperitoneal space between the upper pole of the right kidney and the inferior surface of the liver is entered. The parietal peritoneum is mobilized from the under surface of the diaphragm, and the abscess drained.

Reports of the treatment of solitary liver abscesses since the advent of the antibiotics have been few. Kisner's cases are of great interest in this connection. In the second of his three cases, while waiting for adequate adhesions to wall off the disease process, penicillin was given parentally and also injected into the abscess following aspiration. At the second stage operation, several days later, the abscess cavity was found to contain only a few cubic centimeters of bloody fluid. His third case received penicillin for forty-eight hours pre-operatively. At operation, the pus evacuated was found to be sterile on culture.

Case Report

The patient is a thirty-six-year-old married white man who was first admitted to the hospital on April 20, 1948, with the chief complaint of severe steady pain in the epigastrium and right upper abdominal quadrant of one day's duration.

Past History.—This patient had had a long history of pain in the lumber portion of his back dating back to 1936. In 1939 removal of the inferior portions of the spinous processes of the first, second and third lumber vertebrae with accompanying ligaments was performed. In 1942 a protruded fourth lumbar intervertebral disc was removed. In 1943 a recurrent protruded intervertebral disc was removed and a spinal fusion performed. However, he continued to have difficulty with his back.

He had also had a history of recurrent spells of diarrhea during periods of severe nervous strain dating back about two years, consisting usually of watery stools after each meal. In 1947 he had been studied from this standpoint at the Mayo Clinic at the time of one of his many admissions there for his back trouble, and it was felt that the cause of the diarrhea was on a functional basis. The investigation at that time included many negative stool examinations.

Present Illness.—The day before admission the patient noted an intermittent, vise-like severe pain in the epigastrium and right upper abdominal quadrant, not crampy or colicky. It occasionally radiated through to the middle portion of the right back at about the level of the eighth to the twelfth thoracic vertebrae. This he stated was separate and different from his old back complaint. He had noted a slight fever in the preceding twenty-four hours, but no chills. He had been mildly nauseated, but had not vomited. There had been no jaundice, nor any diarrhea or abnormalities of the stools. He had had a mild "head cold" about three to four days before admission with a mild dry cough.

On entrance into the hospital, the patient's temperature was 102° F., the pulse was 100, respirations were 18. The blood pressure was 132/70. He was flushed and perspiring and was in acute distress. A general examination revealed a diffuse tenderness and moderate rigidity in the right upper abdominal quadrant. No rebound tenderness was elicited, and no masses were palpated. There was moderately hyperactive peristalsis heard upon auscultation of the abdomen.

X-rays of the chest and abdomen were interpreted preoperatively as negative. On critical review of the chest x-ray postoperatively in conference with the roentgenologist, it was felt that there was a minimal infiltration at the left base and left cardiac border, consistent with a mild broncho-pneumonia. The diphragm shadows were clear and at normal levels. The white count was 22,100, with 86 per cent neutrophiles. The sedimentation rate showed a fall of 45 mm. in one hour. A urine examination was entirely negative except for a faint trace of albumin. The serum amylase was 305 mg. per cent,

somewhat above the 200 mg. per cent considered normal at this laboratory. This moderate elevation of the serum amylase was considered to be suggestive, but not diagnostic enough to warrant ignoring what appeared to be a quite typical picture of acute inflammatory disease of the gall bladder. A tentative diagnosis of acute cholecystitis was made and the patient was operated upon seven hours after admission.

The abdomen was opened through a long right rectus incision. A complete exploration of the abdomen was made but revealed only the presence of a chronic inflammation of the gall bladder, which was thereupon removed. The common duct appeared entirely normal. Palpation of the pancreas revealed no abnormalities. Pathologic examination of the gall bladder showed evidence of a mild inflammation characterized microscopically by lymphocytes and fibrotic changes in the wall.

Postoperatively, the patient was carried on continuous nasal suction for the first three days. The rectal temperature ran from 100° to 101° F. for the first four days and was normal thereafter. He was given large doses of antibiotics daily for ten days. The infiltrative process at the base of the left lung was shown to have disappeared completely by a chest x-ray taken two days before his discharge from the hospital on the eleventh postoperative day. An electrocardiogram on the fourth postoperative day was interpreted as being within normal limits.

Four weeks later, the patient was re-admitted to the hospital on May 27, 1948, giving the history that for a short time after returning home he had done well, but in about one week had begun to pursue a downhill course, with malaise, anorexia, recurring fever, and gradual loss of 20 pounds in weight. In the week prior to admission he had suffered from nausea and vomiting and had been unable to retain anything solid taken by mouth. He had felt quite distended and had belched frequently. No spontaneous stool had been passed in this week.

When first seen, he presented evidence of weight loss and severe dehydration. He appeared acutely ill, and complained of a steady rather severe pain in his right upper abdomen. His temperature was 99.8° F., the pulse 92, the respirations 16. The blood pressure was 108/68. A firm rounded tender mass was palpable in the midportion of the upper epigastrium. It was non-movable and seemed semi-fluctuant. It was approximately 6 to 8 cm. in diameter, although its edges could not be clearly defined.

A scout film of the abdomen showed no evidence of intestinal obstruction, gastric dilatation, or other pathologic conditions and a chest x-ray was negative. The hemoglobin was 14.9 gm., the red count was 4,800,000, the white count 13,500 with 78 per cent neutrophiles. The sedimentation test showed a fall of 96 mm. in one hour. The blood urea nitrogen was 16 mg. per cent, the CO_2 combining power was 73 vol. per cent, and the chlorides were 496 mg. per cent. The urine was entirely negative. A blood culture showed no growth in forty-eight hours.

For the first two days after admission, he was allowed only small amounts of liquids by mouth, and he was given intravenous fluids in large amounts with supplementary parenteral vitamins, followed by distinct improvement. He had a daily afternoon elevation of temperature, varying from 100.6° to 101.2°. During this time the mass described in the upper abdomen increased somewhat in size, and became excruiatingly tender.

Under general anesthesia, forty-eight hours after admission, an incision was made directly over the abovementioned mass. The tissues of the various layers of the abdominal wall were moderately edematous and quite indurated. The peritoneum was opened and in the anterior edge of the right lobe of the liver a rounded mass was seen covered with whitish, thickened liver capsule. An incision was made into the mass, and about 300 to 400 c.c. of thick cream colored pus were evacuated. The pus was not the cholocate color described as being characteristic of an amebic abscess. A cautious digital exploration of the abscess cavity was done. Further general exploration was not done although it might have been well to have taken a biopsy of the wall of this abscess. A soft Penrose drain was placed deep in the abscess cavity and brought out through the incision which was then closed about it in layers.

In twenty-four hours the patient's temperature dropped to normal and remained so thereafter. For the first three days, he was carried on parenteral fluids, large doses of antibiotics, a gradual increase in oral intake and by the eleventh postoperative day, the patient was feeling fine, eating well, and had gained eight pounds in weight.

A direct culture from the contents of the liver abscess at the time of surgery showed streptococcus viridians. No amebac were seen on fresh direct smear. Postoperatively, four successive stool cultures were negative for pathogenic bacteria and for entameba histolytica in either vegetable or encysted forms. A proctoscopic examination showed a perfectly normal rectum and rectosigmoid for a distance of 25 cm. A fresh smear taken from the bowel wall during this examination was negative for entameba histolytica. Roentgenologic studies of the colon gave negative results.

The drainage from the wound was surprisingly small and was purulent for the first few days only. The drain was gradually shortened and was removed on the fourteenth postoperative day.

When seen about a month later, the patient stated that he was eating well, his strength was excellent, and he had had no symptoms referable to his abdomen. The wound healed normally.

Six weeks postoperatively the patient was in excellent health, except that he had been having occasional loose stools after meals for a few days. As in the past, these symptoms coincided with a period of excessive nervous tensions.

Discussion

The exact etiological basis for the pyogenic liver abscess in this individual is still a matter of some conjecture, although the possibility of its being amebic in origin has been pretty well eliminated. The most likely explanation is that the abscess was primarily a so-called solitary pyogenic abscess probably of metastatic origin, such as those de-

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scribed by Rothenberg and Linder possibly arising from a respiratory infection. Its incipient stages may have been responsible for the symptoms that led to his cholecystectomy.

A number of other possibilities might be developed, for which there is only little evidence, and certainly no definite proof.

1. Cholecystic disease might have initiated the disorder. This is unlikely. In a single reported case where biliary tract disease was the etiological agent, the abscess resulted from direct extension of an acute suppurative or gangrenous cholecystitis, quite the contrary to this case. In a review of all the available literature from 1930 to the present dealing with complications and mortality following biliary surgery, only one case of liver abscess was described (Doran et al). The articles consulted represented about 45,000 cases. However it is readily understandable that many of these complications would go unreported.

2. A branch of the right hepatic artery might have inadvertently been ligated at the original cholecystectomy, producing an infarct which became secondarily infected, with abscess formation. This is unlikely because one would have expected in the postoperative period more immediate signs and symptoms of something drastic taking place, whereas the patient made a normal recovery. Also, this theory offers no explanation for the definite signs and symptoms that led to the cholecystectomy.

3. Amebiasis may have been the underlying factor all along, with an amebic hepatitis having been present for several years prior to the first admission, which progressed to abscess formation, and the abscess becoming infected with secondary invaders producing the symptoms and signs leading to his cholecystectomy. The ubiquitous postprandial loose stools seem to favor this amebic theory, but the following facts are rather good evidence against this: (a) The presence of the regularly occurring "diarrhea" so suggestive of an exaggerated gastro-colic reflex, yet the patient maintained his normal weight and general good health. (b) The failure on many stool examinations, properly secured, to demonstrate the parasite. The presence of a diarrhea in amebic infestation usually means left colon involvement, and there should have been some positive evidence in the many stool examinations, repeated proctoscopic examinations and colon fluoroscopic examination. (c) The failure to demonstrate any amebae in the pus from the abscess. These should have been found since the abscess was a recent one, and it has been shown that the organisms are usually present in this type of abscess. In long standing cases where the abscess wall is fibrotic it is necessary to scrape the wall to obtain the organism. Furthermore the pus was creamy in color and not the typical "chocolate sauce" variety which is so characteristic of amebic abscess. (d) The failure of the patient's symptoms to be affected in any way by a therapeutic trial of specific anti-amebic medications, carried out some months later at home.

4. A mild chronic relapsing pancreatitis with secondary cholangiocholecystitis and hepatitis may have started the sequence of events. This possibility has much to be recommended it, but again there is no definite proof. The moderately elevated serum amylase at the time of cholecystectomy is not very good evidence. In this connection, Pemberton, Musgrove and others have recently shown that involvement of the pancreas by an adjacent pathologic process may produce a moderate elevation of the serum amylase.

Summary

1. A case of solitary pyogenic abscess in the anterior right lobe of the liver is hereby presented which was cured by incision and drainage.

2. The pathogenesis of this abscess was most likely a metastatic infection through the hepatic artery arising from a pre-existing respiratory infection.

3. The symptomatology in this case so closely simulated that of an acute cholecystitis, that cholecystectomy was done, only to find that four weeks later the abscess in the liver became obvious.

4. From the prognostic and therapeutic standpoint, it is important to differentiate between solitary and multiple pyogenic abscesses. The solitary types have less violent constitutional manifestations, less pain, and less leukocytosis than do the multiple. In addition, the multiple liver abscesses usually have a pre-existing infection in that part of the abdomen drained by the portal system. Jaundice is more common in the latter type.

5. In the differential diagnosis of pyogenic liver abscess, the most likely conditions to be considered are cholecystitis, subphrenic abscess, suppurative lesions of the right kidney and early pneumonia.

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SUBFASCIAL FAT ABNORMALITIES AND LOW BACK PAIN

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IN recent years several investigators have called attention to the importance of fat tissue in the subfascial spaces as factors in painful syndromes. Our former concept of fibrositis as a clinical or pathological entity involving muscle or fibrous tissue has been dispelled by the discovery that the painful lesions which were interpreted as "fibrositic" nodules are, in reality, masses of fat tissue which have undergone changes and are causing varying degrees of disability.

The principal contributors to our knowledge of the painful lesions of fat tissues are Copeman and his associates.[1,2] The original studies were made in cases of painful disabilities of the back. After charting the location of the trigger-points, usually represented by a tender nodule of tissue, dissections of the muscular and fibrous tissues in the painful areas were undertaken. It was revealed that the deep fascia of the back was frequently defective or very thin, permitting the fat tissue underneath the fascia to herniate through the defect. Three types of herniation are described: the pedunculated, the non-pedunculated and the foraminal, the latter occurring through the foramina of the lumbar nerves as they pierce the deep fascia. Another form of abnormality in fat tissue is edema of individual lobules, causing pain presumably by tension of the tissues.

Within the confines of the basic fat pattern described by Copeman,[1] the site of predilection for herniation is a narrow strip along the lateral border of the sacrospinalis muscle from the lower costal margin to the iliac crest. Tension syndromes due to edema are likely to arise from the region of the sacrum, from the area of residual fat situated immediately below the rim of the ilium, and from the dorsal fat pad, a diamond-shaped area in the upper part of the back, corresponding roughly to the outline of the trapezius muscle which lies beneath it.

An additional abnormality of fat tissue is described by Copeman as panniculitis, which occurs in abnormally deposited fat, mostly in predictable sites.

Among the etiological factors mentioned by Copeman[1] are endocrine disorders, sodium balance, heredity and exposure to cold environment. Treatment is discussed from the standpoint of diet, endocrines, diuresis and dehydration, physiotherapy, injection and surgery.

Herz[3] reported thirty-one cases in which treatment consisted of surgical removal of the painful lesion. In a later report (quoted by Hucherson and Gandy) his series consisted of 229 cases, of which sixty-seven were subjected to operation. Hucherson and Gandy[5] report thirty-two cases in which surgical treatment was employed. They state that operation was considered necessary in approximately one-fourth of the patients; in the remainder, adequate relief was obtained by injection with local anesthetic. Orr, Mathers and Butt[12] described fibrolipomatous lesions as sources of somatic pain and directly responsible for clinical manifestations which suggest disease of the kidney or ureter. A form of fat abnormality, episacroiliac lipoma, has been described by Hittner[4] who reported a series of fifty cases in which the lesions were removed by operation. Relief of pain in the lower part of the back was obtained in forty-five instances.

In all these reports there seems to be general agreement regarding the nature and the location of the painful structures, the methods of identification, and the high percentage of successful results following treatment.

From personal observations on patients with painful back, it is possible to agree with many points discussed by Copeman and others. Of those who were treated by injection of local anesthetic into the painful or tender sites of the back, it was possible to obtain varying degrees of relief from pain in the majority of cases. In some instances relief was complete and apparently permanent; in others it was incomplete, and recurrence was not uncommon. Efforts were directed toward locating the primary source of the pain, as manifested by localized tenderness. By careful palpation it is usually discovered that the tenderness is distributed over a large area of the lower part of the back, though frequently localized in more clear-cut intensity at certain sites.

Referred pain is a common subjective manifestation. This is frequently noted in the lower

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extremities, although it may also occur in other portions of the lower part of the back. It is more often unilateral. It is generally accepted that referred pain has a segmental pattern; it occurs within the distribution of the same spinal nerve as that from which the primary pain arises. It is also agreed that sensory innervation of the deep skeletal structures differs greatly from the pattern of dermatomic supply. Our knowledge of these characteristics of deep somatic pain is derived largely from the investigations of Lewis and Kellgren,[10] Kellgren,[7,8,9] Inman and Saunders,[6] Sinclair, Weddell and Feindel,[13] Wolff and Wolf,[14] and many others. The practical significance of referred pain lies in calling attention to a primary focus of pain elsewhere. The source of pain of this nature is rarely located by the patient with any degree of accuracy. If on examination the trigger-point is irritated, reference of pain serves as a valuable aid in identifying the algogenic region.

Referred tenderness is a characteristic of deep somatic pain which, although it suggests a similarity to referred pain, is vastly different in its mechanism of development and usually in its topographic location. This term is applied to sites of hyperalgesia, resulting as secondary phenomena to the primary source of pain. Thus it is possible in many instances to elicit tenderness at numerous points in the lower part of the back or the buttocks, in locations remote from the trigger-point. The degree of tenderness is variable. Where numerous sites of this nature becomes evident, it is often confusing and difficult to locate the trigger-point. It is frequently necessary to determine the point of origin of the pain by a process of elimination—by injection of local anesthetic into successive tender regions. Thus, by a successful injection of the trigger-point, all pain and all tenderness can be abolished; on the other hand, injection of a secondary site of pain is usually effective only in relieving the tenderness at the treated area.

The status of our knowledge of referred pain has recently been defined as follows: "Stated broadly, then, the numerous shades of opinion can be reduced to two opposing beliefs. The first of these is that some mechanism located in the central nervous system is responsible for all the phenomena of referred pain, and the second is that these phenomena are produced by events taking place in the periphery. It is no doubt possible that by considerable amplification of one or other of these theories a hypothesis might be arrived it, which would adequately overcome the objections which could be levelled against it. Nevertheless, the fact remains that, *as they are at present stated*, neither hypothesis is capable of explaining all the observed facts . . ."[13]

Sinclair, Weddell and Feindel[13] suggested, further, the following hypothesis for occurrence of referred pain and tenderness in somatic structures: "The anatomical basis of the physiological processes concerned in the production of referred phenomena is the branched axon. In any given case there are two main mechanisms at work; the first of these is the misinterpretation by the central receiving apparatus of the source of the painful impulses, and the second is the production in the periphery, as a result of antidromic impulses, of metabolites which at first stimulate the nerve endings there and later damage them. It is probable that the operation of the first of these mechanisms gives rise chiefly to referred *pain*, while the chief result of the operation of the second is referred *tenderness*, but both mechanisms must be considered in relation to either phenomenon."

"Anesthetization of the area of reference will affect the second mechanism in two ways, first by the interruption of the painful impulses arising there on their way to the central nervous system, and secondly, by the blocking of the antidromic impulses which are activating and perpetuating these painful impulses. The result of this procedure is therefore to abolish the pain and tenderness resulting from the operation of the peripheral chemical mechanism."

A study of records indicates that the most common manifestation found in cases of painful back is tenderness in the sacral paraspinal region. This may involve one or both sides of the midline. In case of a bilateral site of tenderness in the sacral region, usually only one side harbors a lesion which is sufficiently painful to cause disability and therefore require treatment. In many instances when the trigger-point of pain is located in that area, injection with local anesthetic will provide relief for indefinite periods of time, varying from weeks to months and sometimes permanently. When pain recurs after short intervals or in cases where no relief is obtained beyond the duration of the local anesthetic effect, surgical removal of the painful lesion is indicated.

Another location in which abnormalities of fat tissue develop as primary sources of pain is the ilio-lumbar area, along the lateral margin of the sacrospinalis muscle. The most common condition at this site is a herniation of fat lobules through the deep fascia.

It is necessary to mention that the apparent ease with which other observers are able to identify the painful lesions represents an understatement or a misunderstanding of the total picture of such abnormalities. Most patients do not present the typical clinical manifestations, consisting of a history of pain and a palpable, sensitive nodule, so easily located and treated; many patients, in fact, do not present any nodule or enlargement which is significant. In addition, tenderness is often elicited only on heavy pressure and after meticulous search in the suspected location. When multiple sites of tenderness are encountered, it becomes necessary to determine the primary source of the pain. Apparently Moes[11] has recognized similar situations in the subcutaneous nodules lacking the trigger-point tenderness and the typical relief on injection. The procedure of local anesthetization is necessary in all cases for positive identification of the primary source of the pain; it is especially useful when pain and/or tenderness are widespread and where a clear-cut radiation of pain cannot be elicited so that the patient is able to identify it as that which he experiences.

The technique of injection consists of locating the painful area with the point of the needle. This requires the patient's co-operation. The site of the pain is infiltrated and, after anesthesia is obtained, the point of the needle is manipulated to disrupt the tissues from which the pain arises. It is advisable to warn the patient that the pain may be aggravated temporarily after the local anesthetic is absorbed.

Surgical treatment, when necessary, is carried out under local anesthesia. In this, the patient's co-operation is needed. After infiltration of the skin, the incision is made and dissection is carried out down to the fascia. The fascia is examined visually and by probing with a needle for the purpose of identifying the location of the abnormal tissues. It is sometimes possible to incise the fascia without causing excessive pain. It is always desirable, if possible, to locate the trigger-point accurately prior to anesthetization of the deep tissues. The deep fascia is then incised and the abnormal tissues are removed. As there is frequently a prolonged and a persistent accumulation of blood and serum from the surgical field, it has become a practice to leave a small drain in the wound for a period of five to seven days, after which a sinus is formed. This usually heals in three to four weeks. Ordinarily patients need not be hospitalized.

Surgical treatment consisted of eleven operations on ten patients. In three the operative site was the ilio-lumbar region, at the lateral margin of the sacrospinalis muscle. In one of these, the abnormality consisted of swelling of several fat lobules underneath a very thin portion of the lumbodorsal fascia, which was bulging but not ruptured. In a second, a bilateral operation showed on each side small herniations through the fascia. In a third case, a marked sciatic scoliosis and pain in the gluteal region were associated with tenderness in the ilio-lumbar area at the level of the iliac crest. These features were satisfactorily corrected on two different occasions by preoperative injection of procaine. At operation, the painful area was identified by the patient in a small patch of the lumbo-dorsal fascia. This was incised. The only feature which appeared significant as an abnormality was a firm adherence of several small masses of fat tissue to the ventral surface of the fascia. This was resected. Postoperative progress was satisfactory for five days, after which the pain and the curvature reappeared. These manifestations were relieved by evacuation of a small hematoma. During the next two weeks a firm swelling, suggesting a cyst, developed in the operative site, and with this, a recurrence of the pain and the scoliosis.

In seven patients the sacral region was explored; the operation was bilateral in four. The findings here consisted of swollen lubules of fat tissue underneath the deep fascia. The enlarged lobules or "bubbles" of fat were removed together with other portions of fat tissue in the operative field which were apparently normal. The swelling was the only significant abnormality which was encountered. Microscopic examination showed normal fat tissue.

All these patients were afflicted with varying degrees of disability due to pain in the lower part of the back. In the majority of these, the pain was referred elsewhere, most commonly to the lower extremity. In one case the back pain was associated with coccygodynia. In two cases pain

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referred to the upper portion of the back was relieved following the operation. In four patients, headache was a prominent symptom, apparently related to the pain in the lower part of the back. These unusual phenomena require a more detailed analysis which is planned at a later date.

The immediate postoperative results have been uniformly satisfactory. Relief from pain has been prompt in all cases and, with one exception, has been maintained during the period of observation, varying from two to twelve months.

Summary

From a review of the literature and observations on ten patients, it is evident that abnormalities of subfascial fat tissue constitute an important factor in the development of painful disabilities of the back. The principal features responsible for clinical manifestations are edema and herniation of the fat tissue. A knowledge of the principles and the mechanism of referred pain is essential for adequate evaluation of the clinical phenomena.

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SOLITARY PYOGENIC LIVER ABSCESS

(Continued from Page 592)

6. The complications of these abscesses are concerned with rupture of the abscess into the pleural or peritoneal cavities, lungs or surrounding viscera.

7. With proper treatment, the prognosis in the solitary type of liver abscess is much better than that in the multiple. In large series of cases the former carry a mortality rate of 37.5 to 60 per cent, while in the latter it is usually given as 90 to 95 per cent. Without treatment the mortality rate in either type closely approaches 100 per cent.

8. Treatment consists of early incision and drainage of the abscess either anteriorly or posteriorly in such a fashion as to avoid contamination of the pleural or peritoneal cavities.

9. With the present day advantage of the antibiotic drugs much improvement may be expected in the prognosis of these abscesses, since most of them are due to the staphylococcus, streptococcus and colon bacillus.

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HEMOLYTIC TRANSFUSION REACTION IN OBSTETRICS

Report of Case

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DOUBTLESS hemorrhage is now the most important complication of obstetrics. Transfusion is the immediate stop-gap in treatment and no doubt accounts for decreasing mortality. Nevertheless, in practice one is at times sharply made to feel the inherent danger of this now commonly used procedure. These dangers are illustrated by the following case.

The case is that of a twenty-seven-year-old woman, gravida III, who came into the hospital in the fifteenth week of her pregnancy bleeding profusely and having severe cramps and faintness. She had not to her knowledge passed her fetus. Examination showed a very pale young woman with a pulse of 108, and blood pressure of 100/52. The uterus was soft and the size of a three and a half months' gestation. Her hemoglobin was 13 grams on admission and leukocytes 3,150. In a few hours the hemoglobin dropped to 9.9 grams, and 500 c.c. of whole blood, type AB, Rh positive (homologous), was given with 1000 c.c. of 5 per cent glucose and saline. Ergotrate also was given intravenously. She was then taken to the operating room. Under 24 c.c. of pentothal anesthesia intravenously, examination showed the vagina filled with 500 c.c. of clots. Fetal membranes and large pieces of placenta were removed and the cavity of the uterus thoroughly cleaned. The report of the pathologist was "incomplete abortion." The patient's condition was satisfactory except for pallor and a pulse of 104 and blood pressure of 92/66.

That evening her hemoglobin had dropped to 7.8 grams, and a second transfusion was ordered. On the third hospital day a second transfusion of O positive blood was started at 4:30 p.m. and discontinued at 5:40 p.m. Soon thereafter she was noted to have headache, backache, and an indescribable tense feeling in her trunk as though she would burst. Her pulse was now 130 and regular. She vomited considerable cherry colored liquid flecked with blood. This was chemically positive for blood. Soon there was diarrhea with gross blood. She presented an appearance of profound shock. She was given atropine and benadryl with no apparent change. At 8:15 she was catheterized and 100 c.c. of bile-stained urine obtained. This showed destroyed red cells—loaded —and 4-plus albumin. She received 500 c.c. of sodium lactate solution at three different intervals in an attempt to keep the urine alkaline. The day following transfusion, 165 c.c. of urine was obtained in three catheterizations. On the second day following transfusion, no urine whatever was passed; on the third day she passed 5 c.c. of very thick urine; on the fourth day no urine was passed; on the fifth day 5 c.c. was passed; on the sixth day she passed four small specimens, a total of 10 c.c.; on the seventh day she passed 38 c.c. in four voidings; on the eighth day she passed 140 c.c. on two occasions, and by the eleventh day she had increased her output to 2485 c.c. of urine. The first two urines showed 4-plus albumin and were positive chemically for occult blood. Albumin was 4-plus to the sixth post-transfusion day. On the eighth post-transfusion day there was 1-plus albumin and thereafter it contained no albumin. On the day of reaction, the direct Van den Bergh was 1.3 mg. per cent, and the indirect Van den Bergh was 3.4 mg. per cent. The next day it was 0.13 mg. per cent, and 1.85 mg. per cent.

The blood urea nitrogen on the day following reaction was 29 mg. per cent. It rose rather evenly to a high of 110 mg. per cent on the tenth post-transfusion day and was 84 mg. per cent on the day of discharge. Several weeks later it was 11 mg. per cent.

The CO_2 was 75 vol. per cent on the day following her reaction and varied from 51 to 63 per cent and was still 51 vol. per cent on the day of discharge.

The blood chlorides were rather stable. On the third day their value was 542 mg. per cent; was lowest (482) on the fifth day, and 572 mg. per cent on the day of discharge.

The hemoglobin dropped to 7.4 grams following transfusion reaction, was 8 grams on the seventh day, and again 7.8 grams on the fourteenth day.

The white cell count was highest on the third day when it was 32,520, and gradually dropped to 12,300 on the tenth day.

The blood pressure remained remarkably stable after being at shock level of 80/55 some nine hours after reaction. There was one recording of hypertension on the thirteenth day of 150 systolic and 85 diastolic. This promptly returned to a normal level.

Her weight normallly was about 128 pounds. When taken on the third post-transfusion day it was 136 pounds, and reached 141 pounds on the seventh day. It then orderely receded with increase in urine volume to 120 pounds on discharge.

Except for the post-transfusion fever reading of 103° the temperature promptly came down and remained at 100° or less for the rest of her hospital stay. The pulse likewise, except for the early reaction, remained mostly around 80.

Her gastrointestinal tract had an immediate convulsive session of vomiting and diarrhea. This quieted down to occasional vomiting of small amounts of brown or greenish fluids. She was willing to co-operate in food intake. The most acceptable food seemed to be the pellets of butter and sugar, as suggested by Dr. C. D. Creevy. Normal appetite came back in about two weeks.

The general attitude of this woman throughout this gruelling experience was quiet, even lethargic. She talked very little and at first moved very little. She stated she

had soreness especially in the lumbar region. She was kept in bed eleven days. She was very pale and had some trunk and facial edema before the diuresis, but never any pitting edema of the extremities.

The treatment, as indicated in the chart, was aimed at adequate nutrition, water, and electrolyte balance during the time it takes for the damaged kidney to recover. Diathermy to the kidney areas twice daily was given empirically, believing it might stimulate circulation in the kidney through relaxation of vasospasm.

There seems to be little hesitancy to place this dramatic case as one of transfusion reaction. Of the three types of reaction there are: (1) physical and chemical reaction, (2) allergic or urticarial reaction, (3) hemolytic reaction. Among the latter there are: (a) intra-group type of Rh reaction or "cold" hema-agglutinins, (b) gross incompatibility, (c) dangerous "universal" group O donor.

Strumia stated that when using group O blood it would seem desirable to use those blood with titers of less than 1:60 isoagglutinins. Witebsky et al, feel that this precaution is unnecessary if purified A and B substances are added to the blood in order to neutralize the isoagglutinins. Straumia further suggests that in need of extreme precaution one may use the biological test of giving 100 c.c of the blood and comparing five hours later the serum bilirubin of the patient's blood then with the pre-transfusion level.

The seriousness of this condition, in Strumia's opinion, is modified by several factors. In general, in those with previous kidney damage, the outlook is unfavorable. Those receiving less than 250 c.c. of blood will usually recover. Those receiving 500 c.c. or who have had previous transfusion reactions will usually die.

The incidence and death totals are best illustrated by the groups and statistics collected by Wiener and shown in Table I.

In considering some of the literature on this subject, the most interesting discussion is on the pathogenesis of the sequelae of hemolytic reaction in the kidney. The varieties of theory on kidney pathology are briefly four: (1) blockage of renal tubules, (2) anaphylaxis, (3) nephro-toxic substances released from hemolysis, (4) ischemia of kidney from vasoconstriction.

The theory, from the laboratory studies of Dodds, DeGowin and Richards, of blockage by acid hematin crystals seems not to be substantiated clinically, as in a number of deaths there were few with blocked tubules. Strumia states that in four of his cases there were none blocked.

TABLE I. TRANSFUSION STATISTICS

	Year of Report	No. of Transfusions	No. of Hemolytic Reactions	Deaths
Fresh Blood				
Wiener*	1917-1941	19,275		39
Kilduffe and De Bakey	1917-1941	43,284	80	45
Stored Blood				
Weiner*	1939-1941	8,236		9
N. E. Deaconess Blood Bank	1942-1946	13,000	2	1
Mass. Mem. Blood Bank	1940-1946	6,464	1	0
Hartford Hosp. Blood Bank	1941-1946	16,000	2	0
Mass. Gen. Hosp. Blood Bank	1942-1946	28,588	8	2
Peter B. Brigham Blood Bank	1945-1946	2,140	3	0
Children's Hos. Boston Blood Bank	1946	1,200	1	0
Boston Lying-In Blood Bank	1946	452	1	0
Total		76,080	18	12

*These are the totals of a group of statistics collected by Wiener and presented in his book.

The theory of anaphylaxis is opposed by two facts: one is that hemolytic transfusion reaction usually follows a single dose of whole blood; and, second, urticaria has never been seen with fatal post-transfusion reaction.

That there is a nephro-toxic substance released from blood hemolysis is difficult to prove. Hemoglobin of itself is nontoxic. But the protein substances contained in the red cell stroma is likely to be the toxic factor. This toxic factor leads us into fascinating current work that is being done on renal mechanisms and particularly renal circulation as under control of a neurovascular reflex.

Baldwin Lucké, in a monumental work, studied a series of 538 cases from the clinicopathological viewpoint. He states: "It is appropriate to designate all cases exhibiting these renal disturbances no matter what their etiologic background by a single term." This he gave the name of "lower nephron nephrosis." The various causes of this lesion he lists as follows:

1. Crush syndrome
2. Thermal burns
3. Heat stroke
4. Black water fever
5. Chemical poison or sensitivity
6. Alkalosis
7. Hemolytic transfusion reaction
8. Non-traumatic muscular ischemia
9. Toxemia of pregnancy
10. Utero-placental damage

At present, the exact pathogenesis is not too well known. Lucké states: "Several factors are concerned in combination. Among those impli-

cated are: degradation products of myoglobin and hemoglobin, products of tissue breakdown, physiochemical alteration of blood and body fluids, shock and disturbances of renal blood flow resulting in ischemia of the kidney and anuria."

In a recent article by Mauzy and Donnelly, who studied nine cases of urinary depression in the toxemia of pregnancy, they advance the theory that both the liver and kidney are involved. One detoxifies, the other excretes. The liver is the first line of defense and, in case of damage here, the kidney or second line of defense takes over. They have made a diagram in simple explanation (Fig. 1).

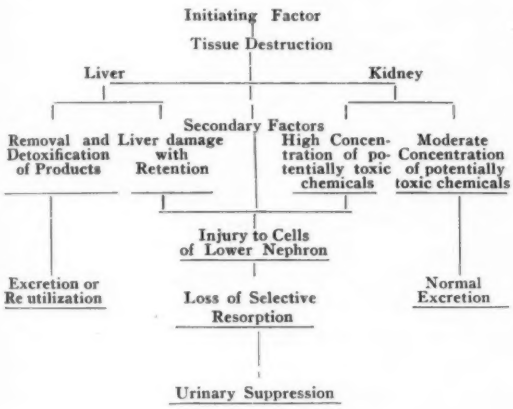

Fig. 1.

This article and diagram bring back to mind the term hepato-renal syndrome seen in the literature a number of years ago.

Ward O'Donnell, in 1949, reported three cases to show proof between lower nephron nephrosis and abortion. There was jaundice in two of the three cases and the third had hepatic zonal necrosis. All three had the typical renal pictures. All three had similar uterine findings, namely, necrotic decidua and chorionic epithelium. He says: "In our cases it is probable that the theoretic substances had origin in the retained placental tissue. . . . It is also possible that both factors—a hypothetic vasonconstrictive humoral substance from the ischemic placenta and toxins from invading bacteria—might, by synergistic effect, act on a susceptible neurovascular mechanism to produce reduced cortical flow, a result not obtainable by either acting separately. The role of bacterial toxins may be that of producing hepatic damage sufficient to produce hepatocellular dysfunction and inability to detoxify circulating placental products. These substances would then be free to act unfavorably on the kidneys."

Obstetricians will be particularly interested in the work of British pathologists and physiologists. The syndrome was first noted in the first World War and then forgotten for nineteen years. In the early part of the World War II, Bywaters and Dible in 1942 noted the syndrome in war injuries and called it the "crush syndrome." They reported a characteristic lesion in the lower nephron manifested by degeneration of the epithelium and deposits in the tubules of crystals of blood pigments.

Identical pathological changes were noted by Bratton and James Young in obstetrical anurias associated with abruptio placentae. J. F. Smith, of London Hospital, in examining seventeen necropsy cases of eclampsia, found pigment casts in the second convoluted tubules and ascending limbs of Henle in three. In two of the three cases there had been oliguria. Abruptio has long been believed to have a background of toxemia. Evidence now suggests that abruptio and toxemias (in certain cases) and crush injuries may have a common picture in this lower nephron nephrosis.

From Nuffield Institute (Oxford) comes an important monograph by Josef Truetta et al, "Studies of the Renal Circulation." Here he postulates by animal study that normally the renal cortex receives most of the blood and the medulla the smaller part. The blood reaching the kidney has two potential routes. The path of the greater circulation is through the cortical glomeruli. When blood follows this route, the glomeruli are well filled, urine flow is normal, and the blood in the renal vein is venous. The pathway of the lesser circulation of the vessels is to the medulla and to the juxta-medullary glomeruli. When vascular spasm shunts blood through this route, the flow of urine is decreased and the blood in the renal vein is largely arterial. The primary cause of lower nephron nephrosis is this cortical ischemia due to a shunting of the blood and its toxic products by a neurovascular reflex into the medulla.

It is further postulated that this neurovascular mechanism of the kidney is largely protective. Though there may be complete desquamation of these tissues, they can regenerate in four to ten days, showing the reparative power of the kidneys provided the individual can survive the repair period. Mr. T. L. T. Lewis believes that if there is a sudden release of toxic products into

the circulation, as in uterine muscle breakdown from abruptio placentae, the kidney deals first in the protective mechanism of the "Truet a Shunt" so as to save the cortex. If this mechanism is overwhelmed or fails, the delicate cortical vessels are injured, paralyzed, engorged and finally blocked. In the first, we have lower nephron nephrosis and possible recovery. In the second, we have cortical necrosis and inevitable death.

The cause of death in these cases is not uremia. More properly it involves electrolyte balance, acid and base equilibrium and water distribution. The diminution of urine, as studied by Bywaters and Dible, "is now due to excessive, but unselective reabsorption of the glomerular filtrate through the tubules—in other words, leakage back into the blood stream." The kidneys are involved in protein metabolism as they can form urea. Therefore, breakdown in kidney function may give rise to toxic protein metabolites. Uremic death is more than an accumulation of urea, uric acid and creatinine.

Prof. K. J. Franklin and his co-workers have shown what a hair-trigger mechanism the renal shunt can be. Stimulation of a sciatic nerve end or the nerve plexus about the renal artery, the injection of staphylococcus toxin or pituitary extract can instantly bring about the cortical ischemia. Another field that can reflexly evoke the "Oxford shunt" is the so-called "stretch stimuli." This is the distension of hollow organs composed of smooth muscle. Distending the bladder with normal saline solution, stretching the intestine or parts of the pregnant and nonpregnant uterus, similarly are followed by this renal neurovascular response. He advances the hypothesis that the toxemia of pregnancy is, or includes, a progressively increasing tendency for the renal shunt to be brought into operation and that cortical necrosis represents the maximal irreversible result of this tendency.

Conclusions

Though constantly minimized by basic research, transfusion is still a dangerous procedure requiring rigid observation of the known rules. Prevention is paramount. The syndrome of lower nephron nephrosis seems to underlie such clinically diverse conditions as shock, burns, eclampsia, chemical poisoning, muscle injury and intravascular hemolysis.

Recent clinico-pathology and physiological reresearch have revealed some of the facts regarding the cellular pathology and the neurovascular mechanisms in the kidney. Furthermore, those facts seem to apply to body defense mechanisms which heretofore were not thought to be related. These mechanisms are probaly basic to homeostasis.

Though many extravagant methods have been tried in the treatment, the simple maintenance of adequate nutrition and water and electrolyte balance best serves the body in the period of the fourth to the tenth day when, if possible, the kidney cellular damage is repaired. The case reported was followed on this basis, with fortunate results.

PSYCHIATRIC EXPLANATION OF BALDNESS

The April, 1950, issue of *Modern Medicine* condenses "A Theory of the Pathogenesis of Ordinary Baldness" from *Archives of Dermatology and Syphilology*.[1] This ingenious explanation relates baldness to tension of scalp muscles creating shearing stresses in the dermis, with subsequent ischemia and alopecia. "This muscular activity probably survives from a once useful defense mechanism in man's phylogenetic past, when the ears were drawn against the head for protection during attack." The authors believe that anxiety in connection with attacks on personal integrity may elicit this basic defensive attitude.

For years we have carried on personally in our absentminded way beneath a cranial dome from which, like the Parsee's hat, the rays of the sun are reflected with more than oriental splendor. To us, in our simplicity, it has heretofore been merely a carefree bald head needing no brush and eliciting only the usual good natured "kidding." In summer it has served as a portable landing field for flies, mosquitoes, and the like, but that it was a survival "from a once useful defense mechanism" in our phylogenetic past in which our musculature slicked our ears back has never occurred to us, especially as we have never been able to wiggle our ears, thereby in our youth having lost considerable face in the presence of those who could and did practice this delightfully entertaining sport.

Our personal integrity has been at times attacked, but our defense mechanism, pinned back ears and low wind resistance on top, has worked well on the whole, now we think about it.

The authors say also "The facial expression associated with early baldness is a fixed smile which indicates hyperactivity of the occipitalis." Until now we had considered it only as an expression of good nature, but that was in our preindoctrination period. Ah, well; live and learn.—Editorial *N. Y. State J. of Med.*, May 15, 1950.

[1] Szasz, T. S., and Robertson, A. M.: Arch. Dermat. & Syph., 61:34 (1950).

PLACENTAL POLYP SIMULATING A CHORIONEPITHELIOMA

Report of Case

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A PLACENTAL polyp is a rare finding. Only a few cases have been reported, and these have not been diagnosed clinically but have had to await a careful study by the pathologist in order to rule out malignancy. Dorsy[3] reported a case in which the tissue was sent to the third pathologist before a definite diagnosis was obtained. In this case, as well as that reported by Hagstrom,[4] the bleeding was so severe that it threatened the patient's life. This also occurred in the patient being reported in this presentation. A patient reported from the records of the Massachusetts General Hospital[5] had severe hemorrhages but this case was also complicated by an acute and chronic salpingo-oophoritis.

According to Curtis,[1] the designation of "placental polyps" has been given to portions of placental tissue of varying size, which may be retained within the uterus for an indefinite period after an abortion or full-time parturition. If the retention be for a considerable time, the placental tissue still attached to the uterine wall becomes slowly incapsulated by concentric layers of blood and fibrin, forming the polyp tumor. On section, such a tumor will present a central nodule of more or less well-formed chorionic villi, with proliferating chorionic epithelium, covered by layer upon layer of organized blood clot and fibrin, together with round cell infiltration. Portions of trophoblast will serve to prolong the pregnancy reaction of the uterus for an indefinite period. Thus, placental polyps are productive of continuous slight uterine bleeding, and they keep the uterus in a state of subinvolution.

The following description is found in *Principles and Practice of Obstetrics* by DeLee-Greenhill[2]: "If bits of placenta or decidua do not become infected, blood is deposited upon them in successive layers, and a fibrinous or placental polyp results. They cause irregular hemorrhage until they are removed, or they become infected, break down, and are discharged piecemeal with fetid discharge and fever, sometimes with hemorrhage. The polyps may produce sufficient gonadotrophic hormone to give a positive reaction to a pregnancy test."

Report of Case

A forty-year-old woman was admitted to St. Mary's Hospital giving a history of irregular menstruation for one year, but more marked during the last five months. The bleeding had been profuse for two days, and just before entering the hospital she had passed a large amount of blood and clots which, she thought, amounted to nearly a quart.

The past history was of no special significance. She began menstruating at thirteen years of age. Periods were always regular up to one year ago, normal in amount, and caused no discomfort. She had given birth to eight children, all of whom were living and well, and had had one miscarriage three years ago. She had not been conscious of being pregnant since that time. Previous surgery consisted of an appendectomy and a thyroidectomy for a toxic adenoma.

The physical examination revealed a well-developed and poorly nourished woman, very pale. The pulse rate was 90 beats per minute. The temperature was 98.2°. The respirations were 20. The blood pressure was 102 mm. of mercury systolic and 75 mm. diastolic. She appeared older than the chronological age. A mass could be palpated in the midline of the lower abdomen, which was firm and smooth and had the contour of an enlarged uterine fundus. Vaginal examination revealed a normal cervix. The body of the uterus was about four times the normal size, firm in consistency, in good position and freely movable. Erythrocytes numbered 2,880,000, and leukocytes 6,600, per cubic millimeter of blood.

The bleeding subsided shortly after admission. She was transfused and prepared for operation, which was done five days later. Through a lower midline incision, a subtotal hysterectomy was done, and the specimen sent to the pathologist, who reported that there was evidence of malignancy, possibly a chorionepithelioma; so the cervix, fallopian tubes, and ovaries were also removed. For diagnostic purposes, a catheterized specimen of urine was obtained while the patient was still on the operating table. This gave a positive pregnancy test.

The convalescence was uneventful. The wound healed by first intention, and the patient left the hospital on the ninth postoperative day.

Pathologist's Report

Macroscopic.—A uterine fundus which measures 9.5 cm. in length by 7 cm. in transverse and 6.5 cm. in anteroposterior diameter. The specimen weighs 210

Presented before the Duluth Surgical Society.

grams. On being opened, there is a large, sessile nodule attached to the posterior aspect of the endometrium. This nodular mass presents a hemorrhagic, slightly necrotic surface, which is moderately irregular. On section

Fig. 1. Low power photomicrograph. (X's) Degenerated chorionic villi enclosed in fibrous connective tissue. (Y) Dilated atropic endometrial glands. (Z) Myometrium.

through this mass, it is difficult to note a line of demarcation between the tumor mass and the myometrium. The latter, however, contains numerous large blood vessels. Further sections through this structure show some areas in which the line of demarcation between the tumor and myometrium is demonstrable. The tumor tissue is highly hemorrhagic and in some portions moderately spongy. A few foci of necrosis are present.

Microscopic.—Permanent sections of the tumor mass within the uterus show a border of endometrial mucosa which is average in appearance. The mucosa grades into decidual tissue which is moderately fibrous and, in part, hyalinized. There are also localized patches of hyperplasia of the large decidual cells. Along the margin of the tumor mass, there are numerous chorionic villi, some of which contain calcarious foci. Some sections show a moderately diffuse infiltration of mononuclear cells and neutrophils. The chorionic villi do not infiltrate into the muscular tissue of the uterus. In some sections, masses of partially organized decidual tissue separate the villi from the myometrium. A slight amount of trophoblastic proliferation is noted in the myometrium. Otherwise, the latter is not unusual.

Diagnosis.—Placental polyp.

Novak gives the following description: "The gross appearance of the placental polyp, together with its grumous hemorrhagic appearance is not unlike that of the chorionepithelioma, and I know of several instances in which such a diagnosis was made in spite of the total different microscopic structure of the two lesions."

Summary

A placental polyp of the uterus is a rare condition and cannot be differentiated from chorionepithelioma except by microscopic study. Both conditions produce gonadotrophic hormone which can be detected in the urine. A case is presented of a forty-year-old woman whose symptoms and whose pathological tissue, both gross and microscopic, correspond to that of the few reported cases.

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EARLY DETECTION OF DISEASE

A little arithmetic convinces one that elaborate annual physical examinations involving complicated procedures and consuming much time of physicians are not the answer to early detection of conditions such as tuberculosis, cardio-vascular disease, cancer, syphilis, and diabetes. The cost is too great and there are not enough physicians.

The answer may lie in multi-phasic rapid screening conducted at the technician level. A number of such experimental programs are now being conducted. In only a few minutes, the person being examined will have a chest x-ray (which may reveal heart abnormalities or lung tumors as well as tuberculosis and certain other lung infections), and a blood specimen will be taken for determination of the blood sugar level and presence of syphilis antibodies. Perhaps other serologic tests will be made. Although physicians will be needed to interpret the tests, the tests themselves will be conducted by technicians.

Such a program will fail completely unless the medical profession is made to understand thoroughly the philosophy of the program, namely, that it does not take the place of the physician in making a diagnosis. In fact, no diagnosis will be made. Only suspected abnormalities will be screened out in this first procedure; the diagnosis will be made later in the physician's office and, it is hoped, at a stage when the physician may be more effective in administering treatment than would have been the case if the patient had waited until the development of full-fledged symptoms forced him to consult a physician.—James E. Perkins, M.D., *Bull. Nat. Tuberc. A.*, January, 1950.

History of Medicine In Minnesota

MEDICINE AND ITS PRACTITIONERS IN OLMSTED COUNTY PRIOR TO 1900

NORA H. GUTHREY
Rochester, Minnesota

(Continued from May issue)

Housen H. Clifton, "cancer doctor," was born in Kentucky in 1830. After the outbreak of the Civil War he enlisted, on August 2, 1862, in Company H of the 72nd Indiana Volunteer Regiment of Infantry and received his discharge on June 26, 1865. In 1866 with his wife Permelia Seeley Clifton and his son William W. Clifton, then eighteen years old, he came to Rochester Township, Olmsted County, and settled on a farm in Section 8, four miles southwest of Rochester on what is still known as the Salem road. Leonard stated that Permelia Clifton also had served her country during the Civil War, as a nurse. In 1887 Dr. Clifton became a member of the local Custer Post of the Grand Army of the Republic, of which for a time he was post surgeon.

What Dr. Clifton's medical training had been is not known; although he treated patients for "la grippe" and other ailments, he concentrated on a domestic remedy, since described as an escharotic agent, for skin cancer. For many years he was called locally the "plaster doctor" or the "cancer doctor." Patients came to him from considerable distances, one at least from Lake Benton, Minnesota. In 1886 recommendations of Dr. Clinton's painless, nonsurgical cancer cure began to appear in the Rochester newspapers and for seven years thereafter there were published also numerous news items about patients he had treated for cancer of the head, face or breast. The most detailed statement, on October 22, 1886, in the *Record and Union,* was as follows:

> Dr. Clifton of Rochester has been for the past sixteen years experimenting on a remedy to cure cancers. He claims to have finally succeeded in producing a remedy that takes out cancers in from seven to fourteen days. All he does is to paint the affected part and the medicine does the work. It does not affect the sound flesh, but destroys the fungus growth of the cancer and it dries up and is easily removed.

Another note, on another subject, was: "Dr. H. Clifton of Rochester has a genuine madstone. Should any one be unfortunate enough to be bitten by a mad dog, the doctor would be glad to let him use the stone."

Housen H. Clifton died suddenly on September 21, 1893, in his sixty-fourth year, from overexertion in fighting a fire which destroyed his home, a few miles from Rochester, on that day. He was buried from the Methodist Episcopal Church of Rochester under the auspices of the Grand Army of the Republic. After his death, his son, William W. Clifton, continued the manufacture and use of the cancer remedy.

William W. Clifton, who was born at Fountain City, Indiana, on December 9, 1848, came to Rochester Township, Olmsted County, in 1866 with his parents,

Housen H. Clifton, farmer and medical practitioner, and Permelia Seeley Clifton. Leonard stated that William Clifton became an ordained minister of the Methodist Episcopal Church but never followed the calling; that he studied medicine under his father and at the Metropolitan School of Physicians and Surgeons (Metropolitan Medical College, Chicago?), from which he was graduated; that he was a Republican "with a strong leaning to prohibition and other reforms tending toward the general good of the country." After his father's death he succeeded to the practice in treatment for skin cancers, as noted, and until the early nineteen hundreds his card appeared in Rochester newspapers: "Cancers cured without cutting. Dr. Clifton's Celebrated Cure. Call on the doctor. W. W. Clifton, Rochester, Minnesota." Subsequently, it is said, he became a veterinarian.

William W. Clifton was married to Miss Alti Wagoner, daughter of respected pioneer settlers who came to New Haven Township in 1856; one of Mrs. Clifton's brothers, Joseph H. Wagoner, was for many years a successful dealer in organs and pianos in Rochester. Dr. and Mrs. Clifton had four children, Nettie, Walter, George and Sadie. Nettie G. Clifton, a graduate of Hamline University, was a teacher in the public schools of Minnesota and North Dakota. She was married, in September, 1902, at the home of her parents, on the old Clifton homestead, to Professor Earl G. Berich, a biologist, of Fargo.

Alexander Brodie Cochrane, graduate of the Minnesota College Hospital on March 24, 1882, came to Rochester, Minnesota, on August 1, 1883, as assistant physician to Dr. J. E. Bowers at the Second Minnesota Hospital for Insane. He was the third physician to be appointed to the hospital staff and was successor to Dr. W. A. Vincent, who in 1881 came as the first junior physician appointed in the institution. On October 11, 1883, under the new state law to regulate medical practice, Dr. Cochrane received certificate No. 46 (R).

Dr. Cochrane's musical ability added to his value as physician: The hospital choir, made up of employes and patients, under the direction of Dr. Cochrane as organist, furnished the music at special services and holiday celebrations. His name has not appeared in connection with a local medical society, for the reason that the Olmsted County Medical Society, inactive at that time, was not reorganized until December, 1885, after Dr. Cochrane had gone. In newspaper accounts Dr. Cochrane was mentioned as one of an operating team, with Dr. J. E. Bowers, who assisted Dr. W. W. Mayo in removal of ovarian tumors.

Dr. Cochrane resigned his position as assistant physician early in December, 1884, and on December 10, after a week's visit with friends in Chicago, he sailed for "his old home in England." He was succeeded at the state hospital by Dr. Homer Collins.

E. G. Cole, professedly a skillful oculist, came to Rochester, Minnesota, early in 1862 for the purpose, he said, of restoring "the blind to sight," no cure, no pay, and remained probably several months. His headquarters were at J. S. Woodard's drugstore. The chief note concerning him was under "Common Council Proceedings" in the *Rochester Republican:* Dr. Cole's bill for services to a certain indigent patient on whose eyelid he had operated, was taken up for reconsideration and it was decided to appropriate fifteen dollars, to be paid when cure should have been effected. Dr. Cole's professional cards in the local newspapers were typical of the notices used by the numerous traveling medical fraternity of the time.

J. C. Cole (1813-1890), an honorable and benevolent man, was the first physician, surgeon and druggist of the village of Marion, Marion Township, Olmsted County, and was in active practice there from 1856 into 1866, under the rigorous conditions of pioneer life.

Born in Butternuts, Otsego County, New York, on January 5, 1813, J. C. Cole was a son of Mr. and Mrs. Richard Cole, who were the parents of nine children, eight sons and a daughter. In 1836 J. C. Cole traveled west to Illinois, where he spent twelve years before removing to Wisconsin. At Plainfield, Will County, Illinois, he was married on September 7, 1848, to Mary Ruth Dupuy; of this marriage there were three children, William, Mary and Helen. Mrs. Cole died on December 10, 1852, and Helen on the following day, both at the family home in Rosendale, Fond du Lac County, Wisconsin. Two years later Dr. Cole traveled from his Wisconsin home to Butternuts, New York, where on January 18, 1854, he was married to Mrs. Almira E. Safford. Of the second marriage there was one child, C. J. Cole.

Dr. Cole first arrived in Marion, Minnesota, on April 11, 1856. After taking up a government claim, he went back to Wisconsin for his family and returned with them one month later. To the settlement, which then comprised a small tavern, a store, a scattering of cabins and the groundwork of a schoolhouse he added a new residence and a drugstore. For a few months in 1863 Dr. Cole had an office on Broadway in Rochester, for the practice of medicine, it was announced, on the most scientific principles of the day. A newspaper note of 1860 indicates that he made an occasional trip east for professional study.

In 1866 there occurred the first of many attacks of the nervous and mental disturbance that made Dr. Cole's hospitalization necessary at intervals the remainder of his life. He died in Minneapolis on January 6, 1890, survived by three children, Mary and William, and C. J. Cole, of Marion, and was buried at Marion; his funeral services were conducted by the Reverend Frank Doran, of Rochester. Mrs. Cole had died in Marion on December 6, 1872.

Two of Dr. Cole's brothers were early settlers in Minnesota: B. M. Cole, of Pleasant Grove, and Dr. G. H. Cole, a dentist of Marion and sometimes of Rochester, from 1859 to 1866. Later Dr. G. H. Cole practiced dentistry in Owatonna, Winnebago City and, after 1882, in Mankato. He was born on May 24, 1832, at Butternuts, New York; was married on April 17, 1861, to Clementine E. Rossman of Rochester; served in Company D of Brackett's Battalion of Cavalry during the Civil War, from January 5, 1864, until he was mustered out in March, 1865, as sergeant, because of disability. He died in Mankato on January 1, 1885.

Homer Collins (1859-1949) was the fourth appointee, the third to serve as the assistant physician on the staff of the Second Minnesota Hospital for Insane at Rochester, succeeding Dr. Alexander Brodie Cochrane late in 1884.

The son of Nelson and Isabella Collins, Homer Collins was born in 1859 in Perinton Township, Monroe County, New York, just ouside the little city of Fairport. Orphaned by the death of his mother when he was a month old and the death of his father less than a year later, he was brought up by his paternal grandfather and two aunts, sisters of Nelson Collins.

He received his early education in the public schools of Rochester, New York, and his academic courses at the Rochester Free Academy and at Cornell University; from Cornell he was graduated in "natural history," and received the cash prize awarded in the department of Dr. Law. In 1882 he entered the College of Physicians and Surgeons of Columbia University, from which he was graduated in 1884 with the degree of doctor of medicine. After taking his degree, he held a

service of several months at the Presbyterian Hospital of New York; attended lectures at the New York Eye and Ear Infirmary, and at the New York Ophthalmic and Aural Institute (after 1913 the Hermann Knapp Memorial Eye Hospital), under the instruction of Dr. Herman Knapp, one of New York's great ophthalmologists and otologists; and took several courses of lectures at the New York Post-Graduate Medical School.

On December 1, 1884, Dr. Collins began his work at the state hospital in Rochester, Minnesota. The physicians of the hospital were an important part of the city and Dr. Collins was no exception. He made many friends and commanded the respect of fellow physicians. On occasion he was one of a varying group, which often included Dr. J. E. Bowers, superintendent of the state hospital, who assisted Dr. W. W. Mayo in performing surgical operations of special interest.

Dr. Collins was a charter member of the Olmsted County Medical Society when it was reorganized in December, 1885, and he became a member of the Minnesota State Medical Society. On April 15, 1887, he received his state license No. 1359 (R) to practice in Minnesota. When he resigned his position at the state hospital in October, 1889, to enter private practice, he was honored by the officials and the attendants, who presented him with a diamond ring and a gold-headed cane. On leaving Rochester, Dr. Collins returned to Rochester, New York, with the idea of entering practice there, but by the early autumn of 1890 he had decided on the Middle West, and after considering Superior, Wisconsin, as a location he settled in Duluth.

In June, 1895, Homer Collins was married to N. Gertrude Sloan of Duluth. Dr. and Mrs. Collins had four children, a son, Homer Collins, Jr., and three daughters, Cordelia, Gertrude and Patricia, all of whom, in 1945, were living in Duluth. Of the four grandchildren, one was in service in the United States Army Air Forces during World War II. (Dr. Collins died on July 31, 1949, at the Duluth Hospital, aged ninety years.)

Discussion of Dr. Collins' long and distinguished professional career in the special fields of ophthalmology, otology, rhinology and laryngology belongs primarily to the history of medicine in Duluth and St. Louis County.

Franklin Judson Cressy, born in 1849, was the son of Mr. and Mrs. F. C. Cressy, who long were respected residents of Olmsted County.

Details of Dr. Cressy's early life and education are lacking. On September 2, 1910, however, he was referred to by the *Olmsted County Democrat* as an "old time resident of Rochester and a grade school pupil here in the Central School the first year it was opened" (1868). He received the degree of doctor of medicine from the College of Physicians and Surgeons of Keokuk, Iowa, in 1877. Earlier, in April, 1876, the *Rochester Post* had referred to him as Dr. Cressy and cited a case in which he had given aid. In March, 1877, this newspaper commented as follows: "The Howard Lake, Stearns County, Minnesota, paper says that Dr. F. J. Cressy, formerly of this city, has entered into partnership with Dr. Knowles of that village for the practice of his profession. Dr. Cressy is a young man of superior qualification and good character and we wish him much success in his new field of endeavor."

Well before 1890 Dr. Cressy was established in practice at Granite Falls, Yellow Medicine County. His state license, No. 581 (R), was issued on December 31, 1883. He was a member of medical societies, county, state and national; his name appeared in the directory of the American Medical Association from 1906 to 1918, inclusive.

W. J. Conan, physician and surgeon, came from Fond du Lac, Wisconsin, to Rochester, Minnesota, in January, 1879, and for about five months, as indicated by his professional card published in the *Rochester Post,* practiced medicine in the city. His office, advertised as open night and day, was over a millinery store, in H. A. Brown's block, on Broadway.

Edwin Childs Cross (1824-1894), one of the earliest and best educated of the pioneer physicians and surgeons of Olmsted County, came in May, 1858, from Brattleboro, Windham County, Vermont, to Rochester, Minnesota, which then was a frontier settlement. His younger brother, Dr. Elisha Wild Cross, had visited Rochester two years earlier and on his return east had described the growing community and its need for physicians. There were in Rochester in 1858 a few inactive practitioners, Dr. M. T. Perrine, the earliest, Dr. L. H. Kelley, Dr. J. N. McLane and Dr. C. S. Younglove, and Dr. I. H. Bardwell, who in 1859 removed to Pleasant Grove. By 1860 Dr. Cross was so well established that he sent for his brother to join him in practice. Although there was a difference of only four years in their ages, Dr. Cross was always called "Old Dr. Cross," and Dr. Elisha, "Young Dr. Cross." The partnership was interrupted in December, 1861, when Dr. E. W. Cross became a surgeon in the Union Army. In later years, it is said, although the brothers consulted each other professionally and part of the time shared offices, in the main they practiced independently.

Edwin C. Cross, born on April 6, 1824, at Bradford, Vermont, was the eldest living child of Peter Cross (1785-1858), farmer and well borer, and his second wife, Dorcas Wild Cross (1797-1839), both of English descent and early settlers in New Hampshire. Peter Cross was the son of Stephen Cross and Margaret Bowen Cross, both of whom were born in the United States. The sisters and brothers of Edwin C. Cross, all of whom, in 1946, were long since dead, were: Abigail W., Elisha Wild, Amos E. (died in Rochester in 1866), Sarah G. (Mrs. Ed. Elliott, of Rochester), Henry and Mary L. Cross. By the first marriage of Peter Cross there were the following half brothers and half sisters: John G., Caroline M., Michael C. M., Dolly G. and Elbridge O. Cross.

At the age of fourteen years Edwin C. Cross decided to become a physician, and in the next eight years, earning his way, he acquired an education, academic and scientific. After early years in common schools and at Bradford Academy, he finished his classical course at Dartmouth College; later, after completing a year's study under Dr. John Poole, of Bradford, an alumnus of the medical department of Dartmouth, he returned to the college to begin his formal medical course. There are in the possession of Miss Louise Cross, granddaughter of Dr. Cross, his cards of admission, in 1844, to classes in surgery, obstetrics, anatomy and physiology, on the recommendation of the New Hampshire Medical Society. Subsequently he attended lectures at Castleton Medical College, in Castleton, Vermont, at the Vermont Medical College, in Woodstock, and at the "College of Physicians and Surgeons" (College of Medicine and Surgery?), in Philadelphia. In 1846 he was graduated in medicine from Norwich University, in Norwich, Vermont.

Dr. Cross had an initial practice of four years in Leyden, Massachusetts, was three years in Guilford, Vermont, and nearly four years in Brattleboro. He was married on October 1, 1849, at Charlemont, Massachusetts, to Fanny E. Marcy, who was born at Coleraine, Massachusetts, on August 15, 1827. Fanny Marcy was a teacher of French at Mount Holyoke Female Seminary (after 1893 Mount Holyoke College), and was the youngest of a family of eleven children, many of whom distinguished themselves in the fields of letters, theology and

science; her brother, Oliver Marcy, LL.D., in the late eighteen seventies was acting president of Northwestern University. Dr. and Mrs. Cross, after the death of their first child and, a few weeks later, loss of their home by fire, set out early in 1858 for Minnesota.

For thirty-four years in Rochester, Olmsted County, Dr. Cross, cultured, progressive, of many interests, was an influential physician and citizen. Tall, heavy and muscular, he was dark-complexioned, had black hair, heavy brows over deep-set eyes, and wore a mustache and chin whiskers. Handsome and dignified as a young man, in later decades he was bowed and rugged, of stern appearance, and of sterner manner which, however, belied his heart. Dr. W. J. Mayo once said of him, "The Old Doctor certainly had a stern exterior, but I have seen him hand a man who was out of luck a thousand dollars and say, 'Here, start over again'." His patients relied on him, his family were devoted to him.

Although, as his grandson has said, he came to the new country "with his two hands, and for professional aids a few surgical instruments, quinine, chloroform, laudanum or opium, castor oil, and whiskey for a heart stimulant," he soon achieved well-earned and increasing prosperity. Practicing in an era marked by inconvenience and hardship, Dr. Cross in saddle, wheeled vehicle, or sleigh, as season demanded, made the long laborious trips throughout the countryside that his extensive practice called for, and gave aid in all the illnesses and accidents peculiar to the times and region. Venerable citizens in various communities have recalled of him and his brother, "The Crosses did all the doctoring in our neighborhood." In emergency he was quick and resourceful, in daily general practice his methods of treatment were perhaps less drastic than those of some of his colleagues.

In his earliest years in the county there were yet Indians of dubious friendliness in the community. Dr. Cross had no fear of sober Indians because they knew and respected him as a "medicine man," but for possible defense against drunken Indians of clouded judgment he carried on saddle or in rig a sawed-off, muzzle-loading, single-shot rifle. In later years he used the gun to shoot fish in the Zumbro River; there was so much metal between the bore and the periphery that he could fire the gun with its barrel under water without danger of its exploding.

Educated as a member of the regular profession in conservative schools, Dr. Cross while in the East became interested in homeopathy, and when he arrived in Rochester he announced himself through the local press as a homeopathic and hydropathic physician and surgeon. For several years after 1860, part of the time in partnership with his brother, he had the Rochester Infirmary, which served as his headquarters, and there made available the homeopathic pharmacopoeia and a variety of soft water baths. By 1867 he had returned to the regular school.

Dr. Cross had a long and honorable record in official medical organizations. A founder of the early Olmsted County Medical Society on April 15, 1868, he was prominent in its activities, and when, on December 4, 1885, the society was reorganized formally, he was a charter member. On June 16, 1869, he became a member of the Minnesota State Medical Society, soon after its reorganization, and well into the eighteen eighties he was a faithful worker, as correspondent, member of committees, and delegate to meetings of the American Medical Association. His Minnesota state certificate to practice, No. 905 (R), was issued on May 9, 1884.

When Dr. Cross arrived in Rochester in 1858, existing conditions of health and sanitation in the city left much to be desired. Presently the newspapers began to print graphic descriptions of straying livestock, muddy, slimy streets, alleys blocked with refuse, and of polluted wells. In 1864 Dr. Cross became a member

of the local board of health and served on it, often as chairman, for more than twenty years. After 1872, in co-operation with the state board of health, he gave detailed reports on outbreaks of disease in surrounding rural districts, and during the smallpox epidemic of 1876-1878 acted as an official vaccinator.

A student of medicine and allied sciences as well as of literature, Dr. Cross possessed a fine library and subscribed to the current medical journals, which he read faithfully. Frequently he was out of town for several days on a series of professional calls in the country,—word would be left at one place for him to come on to another,—and on his return home there would often be awaiting him an accumulation of new medical literature. In order to keep himself up-to-date, it was the doctor's custom on such occasion to retire to his room with books and journals, a pitcher of milk and a plate of bread, and by the light of a student lamp at his bedside, to read all night. As a preceptor he contributed to medical education. Perhaps the first medical student to come under his instruction was his brother Elisha, whose education he sponsored and directed in the late forties in Massachusetts and Vermont. In Rochester, among the young men who studied under him and his brother were Sylvester L. Bedal, from Eyota, Edwin D. Stoddard, of the vicinity of Rochester, and William A. Vincent, an easterner, later of Iowa.

Although Dr. Cross did not seek civic office, and on one occasion declined the nomination for mayor of Rochester, he was active in movements for public welfare. When the Olmsted County Volunteers were organized at the beginning of the Civil War, he was delegated to tender the services of the company to the governor of the state; and in the offices of the Drs. Cross were held organizational meetings of Sanborn's Guards (Oronoco Home Guards). Dr. E. C. Cross was one of the first examiners appointed when, in 1862, the United States Bureau of Pensions was instituted in Minnesota. In March, 1865, he succeeded Dr. W. W. Mayo as surgeon on the Board of Enrollment of the First Congressional District. It is told of Dr. Cross that he was clever in detecting malingerers, especially those who pretended to be deaf. He would listen sympathetically and would seem to be convinced. As such an applicant for exemption was turning to leave the office, Dr. Cross would ring a silver half dollar down onto the floor; two thirds of the "deaf" applicants on whom this device was tried whirled at the sound. In later years Dr. Cross was medical examiner of candidates for training at the United States Military Academy at West Point, was often called as expert witness in medico-legal cases, and was examiner of persons up for commitment to the state hospital for insane at St. Peter and, after 1879, at Rochester.

He was interested in city real estate to the extent, in 1869, of improving a section of northeast Rochester with a group of new cottages, and, in 1878, together with leading business men, of building a large brick block on Broadway in which he and his brother had offices. His chief hobby, however, was a fine farm, "Chesterland," near Chester in Marion Township, stocked with high-grade cattle, where he perfected a model dairy, a rare enterprise in that time. He was influential in organizations for the furtherance of improved agriculture, horticulture, dairying and buttermaking. In 1882, when he welcomed a convention of the Butter and Cheese Association, at its first annual meeting, he gave a keen analysis of farming, dairying and stockraising in the region; he stressed the importance of converting grain farms into livestock farms, and expressed the belief that the time was at hand when many of the grain elevators on the line of the railroads must give place to stock yards, and that cattle cars must become more common on the great lines of transportation from the Northwest. Dr. Cross brought in from Kentucky fine shorthorn beef cattle, raised improved strains of sheep, bred beautiful Morgan horses as well as horses from famous racing and trotting stock, one

of which was the well-remembered Ada Wilkes. He did not race his horses, but privately he tried to beat the track record and often did; when in 1887 he bought from Eleazer Damon, pioneer jeweler, a stop watch for $170, a local newspaper reported the purchase and stated, "A stop watch is getting to be a necessity for all the breeders of fast horses in the city." (In 1947 this watch, still in the possession of the family, was in good condition.) Dr. Cross's sulky was a familiar sight about Rochester, as were his carriages and, in winter, his cutter and his handsome double-seated sleigh generously equipped with buffalo robes. It is said that he brought into the county the first Gordon setters seen here and that Irish setters were another of his favorite canine breeds. One Irish setter, Denny, he trained to ride with him in winter, the dog usually lying across the doctor's feet as a footwarmer, but sometimes taking a turn as driver; on signal Denny would sit with his head resting on the doctor's knee; Dr. Cross would arrange the lines and place them in the dog's mouth, and Denny would hold them firmly while the doctor took time out to warm his hands.

Dr. Cross and his brother in the seventies were among the founders of the Sportsman's Club and the Rifle Club of Rochester. And when the Marrowfats and the Stringbeans, social groups of business and professional men, were organized for the formation of baseball teams that were friendly rivals, the Drs. Cross, each weighing more than 200 pounds, qualified for the Marrowfats.

Dr. Cross was a Republican, a supporting member of the Universalist Church, an early member of the Masonic Lodge in Rochester (once Worshipful Master), holder of the Thirty-second Degree of Masonry, and an officer in the Grand Commandery of Knights Templar. He traveled extensively, combining clinical visits and attendance at medical conventions with conclaves of fraternal organizations.

On the morning of July 4, 1894, occurred the tragic accident that ended the life of this outstanding physician and citizen. Dr. Cross was driving a team of spirited young horses on Main Street and as he neared the southern end of the street he passed some boys who were out to celebrate the Fourth. The boys waited until the team had gone a half block or more before they threw some lighted firecrackers into the road, but the horses heard the explosion and started to run. Dr. Cross succeeded in quieting the horses and pulling them to a dead stop, when at another explosion they lunged and both of the bits broke. In those days Main Street curved to the left at the southern end where a road came in from the right. While trying to guide the running horses to the left, Dr. Cross attempted to swerve them slightly to the right to avoid a pedestrian; the horses swung sharply right, the buggy struck a large tree, throwing the doctor out against a board sidewalk that stood eight or ten inches high, and on into a picket fence that paralleled the walk. Although his injuries were mortal, severe cuts about the head, broken ribs, a shattered femur and a mangled thigh, Dr. Cross remained conscious to the end of his life and told his family the details of the accident. He died on the evening of July 5, 1894. At his funeral services Rochester, and the Olmsted County Medical Society as a group, paid him tribute.

Edwin Childs Cross was survived by his wife, Fanny Marcy Cross, and by three children: Anna Dorcas (1860-1937), Mary Almira (Mrs. Fred. C.) Van Dusen (1863-1938), and John Albert Grosvenor Cross (1870-1928). Three sons had died young: Edwin (1855-1857, Frank Dean (1857-1866) and Edward (1868-1869). The death of Mrs. Cross occurred on September 21, 1901. In 1946 there were living twenty-five descendants of Dr. and Mrs. E. C. Cross.

Elisha Wild Cross (1828-1899), younger brother of Edwin Childs Cross, came to Rochester, Minnesota, as a visitor in 1856 and as a resident in April, 1860, when he joined his brother in the practice of medicine and surgery. It was then that he received the title "Young Dr. Cross," by which he thereafter was distinguished.

Born at Bradford, Vermont, on January 31, 1828, Elisha W. Cross obtained his early education at Bradford Academy and at the Wesleyan Seminary at Wilbraham, Massachusetts. His first medical training he received under his brother's preceptorship, and subsequently he took medical courses at the Castleton Medical College, in Castleton, Vermont, and at the Vermont Medical College, in Woodstock, from the latter of which he was graduated with the degree of doctor of medicine in 1851. In that year he began a five years' medical practice in Reedsborough, Vermont, after which he practiced in Guildford Center, Vermont, until he came with his wife and two children to Rochester. He was married on October 5, 1849, at Bradford, Vermont, to Martha Peckett, who was born in that village on June 24, 1829.

In December, 1861, Dr. Cross was appointed Assistant Surgeon of the Fourth Regiment of Minnesota Veteran Volunteers in the Union Army; on August 9, 1863, he was promoted to major and surgeon and so served until he resigned, because of impaired health, on December 22, 1864. Throughout his service, which took him into famous battles, among them Iuka, Vicksburg, Chattanooga, Lookout Mountain and Altoona, and on Sherman's march to the sea, his record was one of efficiency and skill enhanced by kindness to the sick and wounded and won him their gratitude and affection.

Beginning early in 1866, Dr. Cross, although in close association with his brother, Dr. E. C. Cross, practiced independently of him. For a time Dr. E. W. Cross had his office at his residence on East Fifth Street (East Center Street). His was the heavy general practice, in town and country, of pioneer times. There is record that in the seventies he and Dr. W. W. Mayo together performed various major surgical operations and that in December, 1876, they entered partnership, sharing three offices over Geisinger and Newton's Drugstore on Broadway. This association ended in June, 1878.

Dr. E. W. Cross, like his brother, was tall, dark and strongly built; Dr. Elisha wore a mustache, minus the chin whiskers that his brother affected, and in later years, as ill health forced him into inactivity, he became corpulent. Although each brother had his special bent, the careers of the two, in profession, avocations and recreations, were parallel. "Young Dr. Cross" was a Mason, a member of the Knights of Honor and of other fraternal organizations and of the Military Order of the Loyal Legion of the United States, a supporting member of the Universalist Church, an agriculturist, a founder of the Minnesota Horticultural Society, and a raiser of fine horses and cattle on his large farm "Heathiola" near Chester. Active in all that went to improve the city of Rochester, he was once commissioner at large, long a school commissioner and for many years president of the board of education. For even longer he was the able president of the Rochester National Bank and a director of the Union National Bank.

(To be continued in the July issue.)

President's Letter

DR. POTTS WOULD BE SURPRISED

The excellence of Minnesota medical conventions is an established fact. We look forward to the sessions each year, well aware on the basis of past experience that we will attend stimulating scientific meetings and round-table discussions, that we will be renewing friendships with colleagues that we see, perhaps, only on this once-yearly basis, that we will have an opportunity to view scientific and commercial exhibits of great interest and value.

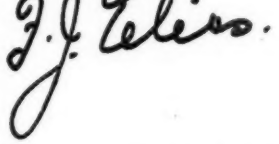
The 1950 convention was no exception. For myself, and I think I speak for all the physicians who attended, it was an outstanding conference.

But Dr. Thomas Potts would have been surprised if he had been there.

For him, the 1950 convention would have been amazing, far beyond the reach of his imagination when, in 1853, he and nineteen other pioneer Minnesota physicians held the first and organizational convention of the Minnesota State Medical Association.

This little band of professional men that, today, would represent, numerically, only one of our round-table discussion groups, has given us a great heritage—one of the most tangible evidences of which is the annual convention, where learning and recreation are balanced to prepare and refresh us for the arduous professional duties that the coming year brings.

It was a pleasure for Duluth physicians to be hosts to so many of our friends from all over the state and to feel that our efforts, in a small way, helped to carry on the noble traditions established by Dr. Potts and his fellow practitioners nearly a century ago.



President, Minnesota State Medical Association

Editorial

CARL B. DRAKE, M.D., *Editor;* GEORGE EARL, M.D., HENRY L. ULRICH, M.D., *Associate Editors*

THE VDRL TEST FOR SYPHILIS

BEGINNING July 1, 1950, the laboratory of the Minnesota Department of Health will report the quantitative VDRL blood and spinal fluid tests for syphilis. The articles by Drs. Kimball and Bauer and by Dr. Lynch explaining the laboratory and clinical aspects of this new serological test appear in this issue. Physicians would do well to read both articles in order to be able to correctly evaluate the new serologic report.

Although there are advantages to the quantitative reporting of the positivity of the VDRL test, it does not follow that the height of the titre correlates with the clinical activity of the disease. On the other hand, the higher the titre, the stronger the serological evidence is for supporting the diagnosis of syphilis. Further, the height of the titre gives no indication of the likelihood of a positive spinal fluid or a paretic curve in the colloidal gold test.

The desirability of a repetition of the test before a diagnosis of syphilis is made still holds. Other factors, such as the presence of infections mononucleosis and smallpox vaccination, may produce false positives. When the serological test is questionable, two full vials of blood should be submitted in order that all the tests may be run. As the new test requires more blood, one would be playing safe in submitting a full vial on each occasion.

INDUSTRIAL COMMISSION REPORTS

OUR ATTENTION has been called by the Industrial Commission of Minnesota to the fact that while most physicians comply with the law in the matter of reporting workmen's compensation cases to the Commission promptly when so requested by the Commission, a few do not. These reports are necessary in order that the injured employe may receive the quick and speedy remedy by way of compensation and other benefits provided by statute. Such offending physicians are not only doing an injustice to their patients, but they are also violating the laws of the State of Minnesota and are subject to a civil penalty of $50.00 for each such failure to report.

The law as it applies to the reporting of Workmen's Compensation Cases to the Industrial Commission is reproduced verbatim below. It is the wish of the Minnesota State Medical Association and the Minnesota State Board of Medical Examiners to co-operate with the Industrial Commission of Minnesota in having physicians make these reports as provided by law. The Industrial Commission has been requested to furnish the names and addresses of physicians who are repeatedly in violation of the law referred to, to the Minnesota State Board of Medical Examiners for disciplinary action such as is used for failure to comply with the laws of the State regarding the reporting of births and deaths.

The Industrial Commission seeks first of all the co-operation of *all* the physicians in the State in this matter. If the report is not forthcoming, the names of the offenders will be referred to the Minnesota State Board of Medical Examiners for disciplinary action.

DUTY OF PHYSICIANS IN REPORTING WORKMEN'S COMPENSATION CASES TO THE INDUSTRIAL COMMISSION OF MINNESOTA

"Section 176.32 * * * Every physician or surgeon who shall examine, treat, or have special knowledge of, any injury to any employe compensable under this chapter, shall, within ten days after receipt of any request therefor in writing made by the industrial commission, report to the commission all facts within his knowledge relative to the nature and extent of any such injury and the extent of any disability resulting therefrom, upon a form to be prescribed by the commission.

It is hereby made the duty of the commission, from time to time and as often as may be necessary, to keep itself fully informed as to the nature and extent of any injury to any employe compensable under this chapter, and the extent of any disability resulting therefrom, and the rights of such employe to compensation; to request in writing and procure from any physician or surgeon examining, treating, or having special knowledge of any such injury, a report of the facts within his knowledge relative thereto.

Any employer or physician or surgeon who shall fail to make any report required by this section, in the manner and within the time herein specified, shall be liable to the State of Minnesota for a penalty of

$50.00 for each such failure, and such penalty shall be recovered in a civil action brought in the name of the state by the attorney general in any court having jurisdiction thereof, and it shall be the duty of the commission when any such failure to report occurs to immediately certify the fact thereof to the attorney general, and upon receipt of any such certification the attorney general shall forthwith commence and prosecute such action. All penalties recovered by the state hereunder shall be paid into the state treasury.

No such report or part thereof, nor any copy of the same or part thereof, shall be open to the public, nor shall any of the contents thereof be disclosed in any manner by any official or clerk or other employe or person having access thereto, but the same may be used upon the hearings under this chapter or for state investigations and for statistics only, and any such disclosure is hereby declared to be a misdemeanor and punishable as such.

For the purpose of determining the merits of a compensation claim the commission may permit examination of its file in a compensation case by an attorney at law upon the furnishing to the commission written authorization therefor, signed by the employe, his dependent or dependents, the employer or insurer, as the case may be.

Any employer or insurer or injured employe shall, upon request of the commission, file with the commission all medical reports in the possession of such employer or insurer having any bearing upon the case or showing the nature and extent of disability; provided, that duly certified copies of such reports may be filed with the commission in lieu of the originals."

Section 176.32 Minnesota Statutes for 1945.

GEORGE E. FAHR

ON JUNE 15, 1950, Dr. George E. Fahr is retiring from the Medical Staff of the University of Minnesota Medical School. For years he has been in charge of the Medical Department at the Minneapolis General Hospital, and the great demand for a residency in his department attests to his ability as a teacher. In his knowledge of the heart and electrocardiography, Dr. Fahr has no peer. He was associated with Dr. Einthoven at the University of Leyden in developing the first electrocardiograph, and the first electrocardiogram taken in this country was taken by Dr. Fahr on his father. Through the years, Dr. Fahr has kept a buoyancy and enthusiasm that is the desire of all medical men. In the future, he plans to do medical consultation in private practice, the Veteran Hospital and also in the Minnesota medical care program with Dr. Ralph Rossen.

In years past, retirement from a teaching post meant the word in its literal sense. Now, such retirement means freedom from administrative responsibilities, time to engage in research, and sharing more fully clinical experience and judgment. We know Dr. Fahr plans to retire in this sense.

THE SAME GUY PAYS

One curse of the Welfare State is the illusion it creates that the people are getting something for nothing.

Take Britain's National Health Service. It was much advertised as the "free" health plan. The British people were to be able to visit the doctor, the dentist, or the wig maker and have their needs cared for without paying anything except a nominal "insurance" premium.

Obviously these payless visits had to be paid by someone but the complications of a 1950 model government budget often obscure where the money comes from. Budget developments in Britain the past couple of weeks, however, shed some light on how these "free" services are financed.

On April 18 Chancellor of the Exchequer Cripps presented to the House of Commons the government's budget for the year which began April 1. The major item of increased spending was for socialized medicine. The amount of that increase was about $363 million, bringing the total to approximately $1 billion for the new fiscal year.

To keep revenues up with expenses, Sir Stafford proposed among other things that the gasoline tax be raised to 20 cents a gallon, from 10 cents, and that a 33⅓ per cent levy be imposed on the sale of trucks.

Much of the burden of those taxes would fall on truck operators. So the beneficiary of health service might say: "That's fine, let the truck owner pay for it."

But it doesn't work that way, as our Mr. Evans reported in this newspaper's "London Cable" yesterday. He says: "The butcher, the baker and the highway freighter are all racing to shift new transport costs to the consumer. They contend they have no other choice after Chancellor of the Exchequer Cripps' double-barreled budget attack on road travel—a 100 per cent increase in the gasoline tax and a new 33⅓ per cent purchase (sales) tax on commercial vehicles."

Meat traders want to impose an extra delivery charge, a subterfuge for a rise in the price of meat which is government-controlled. Green grocers are ready to raise their prices. Fruit and potato men talk of a 10 per cent price rise. Bakers are stirred up, too.

So the higher cost of "free" medicine will go right on the consumer's grocer bill. He may not have to pay the doctor, but he pays, just the same.—Editorial, *Wall Street Journal*, May 2, 1950.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

POLLS SHOW OPPOSITION TO SOCIALIZED MEDICINE

There is mounting evidence that the public understands the dangers in a scheme of government medicine. The Washington office of the American Medical Association reports that overwhelming public opposition to compulsory health insurance has been registered in three polls conducted by Representatives.

Representative J. Harry McGregor of Ohio, sampling his district on this and other subjects, found that only 10 per cent of the people wanted socialized medicine. The vital question which Mr. McGregor asked on his questionnaire was, "Do you favor any type of federal legislation placing the medical and dental profession and operation of our hospitals under Federal control?" The Washington office reports the results:

> "Two thousand replies were received. Mr. McGregor does not give the numerical totals but lists the replies as ten per cent yes, 90 per cent no. A breakdown by professions shows *opposition from 99 per cent of the businessmen, salesmen, professional and retired people.* Next in line in opposition were housewives, 98 per cent opposed; farmers 97 per cent, and attorneys and barbers 96 per cent. Socialized medicine had its strongest support among school teachers, 12 per cent of whom answered yes."

Representative Thomas E. Martin of Iowa made a similar survey which showed only about 14 per cent in favor of compulsory health insurance. Sending out approximately 25,000 questionnaires, Mr. Martin received 4,221 replies, which is regarded as a reliable sample.

Included in the eighteen questions asked, was this: "Do you favor socialized medicine?" Responses totaled overwhelmingly against—3,409 no and 575 yes. It is significant that the districts sampled are almost evenly divided between rural and urban residents.

Representative Henry J. Latham of New York included two important questions in his inquiry: (1) Do you favor socialized medicine? and (2) Do you favor a national health program which would not socialize health services but would supply Federal grants and aids to the States and communities for health purposes? Mr. Latham sent out 95,000 questionnaires and has received 20,000 back, but only 5,000 have been tabulated thus far. In Queens district, only 13 per cent (753 persons) answered yes to the first question; 4,424 said no. The second question brought a more evenly divided answer: 3,009 said yes and 2,136 answered no.

Seeking their constituents' opinion on the matter shows that these representatives are among those actively concerned over this administration measure.

The narrow margin by which the British socialists won the election in February was triumphantly dubbed a "victory" and a "mandate from the people." If such a narrow margin is a mandate, these polls, showing such a large margin against compulsory health insurance, furnish these legislators with a mandate far more significant than any claimed by the British socialists.

MEDICINE CONTINUES TO THRIVE ON TRUTH

The Journal of the Oklahoma State Medical Association recently made an observation on the perennial threat against the advances made by medicine. Under the title, "Medicine Perennially Under Fire," the publication comments:

> "All this agitation about medicine is nothing new. It runs throughout the ages: from 1950 B.C. in Mesopotamia, to 1950 Washington, D. C.; from the shifting sands of the Euphrates to the grass clad shores of the Potomac; from Nebuchadnezzar to President Truman; from Hippocrates, the father of medicine, to Oscar R. Ewing, who . . . wants to be father of us all, thus giving every doctor an oath.
>
> "Through it all there has never been any excuse

for the medical profession to depart from the truth. Even political pressure can be met with nothing as effective as the plain truth about medicine's unfailing service to humanity. It has weathered the rise and fall of all governments and all civilizations. If left alone it will help save and stabilize our own; if subjected to the rule of bureaucracy it will witness the inevitable decline and yet survive to help build another civilization according its wont."

Truth Can Thwart Progress of Socialism

The Federal Security Agency argues that "about 30 per cent of our people cannot afford to pay for their own health services." In the same breath the same agency reports that the death rate for the United States in 1948 was the lowest in the history of the country. Also, since 1935 the percentage of total births delivered in hospitals has more than doubled, being 84.8 per cent as of 1947. Maternal mortality has decreased to a new low. General health conditions in the United States are excellent, and are still improving.

After presenting these truths, *The Journal of the Michigan State Medical Society* remarks, "This gives the bureaucrats a logical (?) reason for changing the program of health service."

Continued medical progress is one of the best ways to combat compulsory health insurance. The above journal says:

"The government now is responsible for an unknown number of our people, variously estimated from 20 to 30 million, who receive complete health service, and the government is having difficulty getting more doctors on its various hospital staffs. If the National Health Service Program were adopted, the number of doctors available would be so inadequate that even Ewing estimates it would take twenty years to get the program operating. More doctors cannot be created by passing a law! They need many years of education and training.

"James F. Byrnes, former Associate Justice of the Supreme Court, former Secretary of State, in a recent article in *Collier's Magazine* (March 4), says:

'If the Politicians will let the doctors alone, the government will be able to continue its boasts about improving health conditions.'"

SOCIALISM—A STEP TOWARD COMMUNISM

Socialism is often thought of as the form of government which will, if left to function and grow, most likely develop into communism. To speed the evolution from capitalism to communism, leftists are now advocating establishment of socialism as an essential step on the way to communism. Les Arends, writing in "Inside News of Congress," comments:

"Those arguing for the Truman program have been heard to say that 'A little socialism is a good thing . . . socialism is the best insurance against communism.' An answer to this comes from no less a person than the new War Minister in Britain's socialistic government, John Strachey.

"In 1936 Strachey wrote: 'It is impossible to establish communism as the immediate successor to capitalism. It is accordingly proposed to establish socialism which can be put in the place of our present decaying capitalism. Hence communists work for the establishment of socialism as a necessary transition stage on the road to communism.'"

BRITAIN'S SOCIALISM—A FRANKENSTEIN MONSTER???

As would be expected, the cost of Britain's socialism is far beyond original estimates. The millions of extra pounds being spent annually may prove to be like Frankenstein's monster and turn against those who helped create the system. Yet, the British people are not receiving extra benefits for that money, because it is now being spent only to keep this system which won out so narrowly in the last election, and which does not improve its services, but only eats more money.

Raymond Moley, writing in *Newsweek* recently, quotes convincing figures about the high cost of socialism:

"In the first fiscal year during which people fully appreciated that they could get something for nothing, 1948-49, the original estimate of cost to the government was 200,000,000 pounds. The cost proved to be 278,000,000 pounds. Presumably Health Minister Bevan and his colleagues thought that a total of 261,000,000 pounds would be enough for 1949-50. The final figure it now seems will be 359,000,000 pounds. But the health service has also drawn 41,000,000 pounds from the national insurance fund and 16,000,000 pounds from ratepayers. So the health service will really cost 416,000,000 pounds, and it is believed that next year it will go to 450,000,000 pounds."

Mr. Moley quotes the London *Times*' dry comment on this situation, that before the final supplementary appropriations are made, Bevan will have to convince Parliament "that he is running and not being run by the service he has created."

The conflict within the concept of a welfare state is then explained by Mr. Moley:

"At that point (when the 'monster' gets out of hand) the Socialist faces an uncomfortable dilemma.

He can completely tighten his control over all concerned—doctors, patients, and local authorities. Or he must surrender his socialism and accept the Conservative principle of a minimum standard based upon proven need.

"Something of the same problem is bound to face all socialistic services. Socialism by embracing a program of fair shares, which really means equal shares, must, if it assures liberty of choice, reach the point where the means no longer exist to permit every recipient to be the judge of his needs. Then government must impose iron controls if it is to keep its socialism. For there can never be equality of demand or equality of productive capacity. When equality is enforced, liberty disappears. That is the irreconcilable conflict within the concept of a welfare state."

OF MICE AND MEN

The lowly mouse is a definite parallel to those who would nibble or gulp down the "free cheese" of socialism, according to the General Electric *Commentator*, quoted in the Harding College Letter:

"Could the mouse, by any chance, get the answer by observing what's happened to others around him?

"Sure, but he won't. Being a mouse, he'll grab—or maybe just timidly nibble—and die!

"What about men? How do too many of us supposedly superior animals act?

"Just like the mouse, just like we had been studying up to be half-wits.

"And we do so in the face of vivid examples—right under our noses and all over the world—that show us we shouldn't.

"Some men have grabbed at something-for-nothing, or 'free cheese,' in sudden and violent communist revolutions.

"Others have only nibbled at 'free cheese' in timid and supposedly harmless collectivist bites—one after another—that will always spring the trap and result in lower living standards and loss of liberty, dignity, and spiritual well-being . . .

"Are we going to prove we're mice—or men?"

ADMINISTRATION CALLED A "PLAYING REFEREE"

With primaries over in some states and still to cause much discussion in others, the *Pennsylvania Medical Journal* urges voters to register and vote, using a sports analogy to emphasize its importance:

"What a furore such a violent reversion of the rules of the game would occasion at a football contest. How the paying spectators would overrun the field to eliminate the referee who claimed a touchdown.

"Why don't the American taxpayers overrun the political field on election day and eliminate the administration that as a 'playing referee' carries the ball with tax money and runs the potato and the egg business, utilities, etc.?

"The answer is that (1) too many taxpayers don't understand the Constitutional limitations against governmental interference with 'free enterprise'; (2) too many of those who do understand don't speak out to their neighbors, don't register to vote, and don't support candidates for office who do support the Constitution of the United States."

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

230 Lowry Medical Arts Building
St. Paul, Minnesota

Julian F. DuBois, M.D., Secretary

Waterloo, Iowa, Physician Sentenced for Attempted Abortion on Minneapolis Woman

Re. State of Iowa vs. Gabriel Bickley Lichty.

On April 27, 1950, Dr. Gabriel B. Lichty, 401½ W. 4th St., Waterloo, Iowa, entered a plea of guilty in the District Court of Black Hawk County, Iowa, to a charge of attempted abortion, and was sentenced to five years in the State Prison at Fort Madison, Iowa. The sentence was imposed by Judge E. T. Evans. Dr. Lichty, who was born in 1903, graduated from the Medical School of the University of Minnesota, in 1927. He is not licensed in Minnesota, but was licensed in Iowa, in 1928.

On October 30, 1949, the Minneapolis Police Department notified the Minnesota State Board of Medical Examiners that a 21-year-old Minneapolis woman was seriously ill in Minneapolis General Hospital following a criminal abortion. Subsequent investigation disclosed that the abortion was performed by Dr. Lichty on October 28, 1949, at his office in Waterloo, and that he was paid $200 for his services. Statements were also obtained from a 26-year-old Minneapolis woman that Dr. Lichty had performed an abortion on her on July 7, 1949, and received $400 for his services. The signed statements were forwarded to the Iowa State Department of Health, and the prosecution of Dr. Lichty followed.

The Minnesota State Board of Medical Examiners wishes to acknowledge the excellent work done by the Minneapolis police officers who were assigned to the case by Mr. Thomas Jones, Superintendent of the Minneapolis Police Department, and also the splendid cooperation received from Mr. Michael J. Dillon, County Attorney of Hennepin County, in arranging for the appearance in Court at Waterloo, Iowa, of the various witnesses in Minneapolis who had knowledge of the facts in both abortion cases.

Minneapolis Man Pleads Guilty in Fake Abortion Racket

Re. State of Minnesota vs. Walter F. Catterson.

On June 1, 1950, Walter F. Catterson, fifty years of age, residing at 624 8th Avenue So., Minneapolis, was sentenced by the Hon. William C. Larson, Judge of the District Court of Hennepin County, to a term of two to eight years in the State Prison at Stillwater. Catterson had entered a plea of guilty on April 27, 1950, to

(Continued on Page 652)

Minneapolis Surgical Society

Meeting of November 3, 1949

The President, Ernest R. Anderson, M.D., in the Chair

THE POSTTHROMBOTIC SYNDROME

NATHAN C. PLIMPTON, M.D.

Minneapolis, Minnesota

Deep venous thrombosis of the femoral and iliac veins produces permanent changes in the limb that affect the physiology of the venous circulation. This altered physiology results in the gradual development of a syndrome climaxed by pain, edema, varicose veins, induration of the subcutaneous tissues above the internal malleolus, pigmentation, a chronic dermatitis of the skin of the lower leg, and chronic ulceration. These symptoms usually develop in this order as early as one to two years or as long as fifteen to twenty years after thrombosis.

It remained for the acumen of John Homans[3] to differentiate between ulcers due to varicose veins and those secondary to thrombophlebitis. In a paper published in 1917, he pointed out that the effect of phlebitis following childbirth, fevers, and intra-abdominal operations is to destroy the valves of the veins in which the inflammation occurs. After recanalization, the lumen remains as a hard, straight, palpable cord through which back pressure is maintained from above as in the case of the typical varicose veins. He proposed radical excision of the ulcer with subsequent skin grafts as a type of treatment. This procedure met with fair success, although in the light of our present knowledge, it was not designed to correct the pathological physiology of the posthrombotic extremity.

Buxton,[1] in 1945, and Buxton and Coller,[2] in 1946, were the first to report interruption of the superficial femoral vein for the treatment of the postthrombotic extremity. They reported a series of twenty-one patients with twenty-three ligations. Of fourteen patients with ulceration, thirteen healed satisfactorily. In the group of seven patients without ulceration, the improvement was not as dramatic; the relief of pain was the most striking result.

Homans,[4] in 1945, was the first to report the division of both the superficial femoral and greater saphenous veins in the treatment of the postthrombotic extremity. He recommended this form of treatment in those cases presenting venous congestion yet with little or no edema. It was from this group of patients that surgery had been withheld in the past because all the distended veins were still considered capable of carrying blood uphill and must not be disturbed. In another group of patients in which there was pain, edema and ulceration, Homans was content to treat more conservatively with sympathetic blocks.

Last year, Linton and Hardy[5] of Boston published a rather impressive report based on forty-nine patients with thrombotic sequelae who were treated by division of the superficial femoral vein and stripping the greater and lesser saphenous veins and their larger tributaries. The incidence of bilateral involvement was 47 per cent. The symptoms of ulceration, stasis dermatitis and pain showed most spectacular improvement. Stasis cellulitis was the least satisfactorily handled. However, none of the patients was worsened by surgery.

An understanding of the pathological physiology underlying the postthrombotic syndrome is essential to satisfactory treatment. Linton makes two important points. First, it is believed that with the exception of pain and edema, the symptoms of this condition do not appear immediately, but only after the veins have become canalized. He observed that 58 per cent of the ulcers in his series occurred between one and ten years after the attack of phlebitis. Second, that postthrombotic ulcerations, unless extremely large, can be healed merely by best rest and elevation. This rather impractical method of correcting the increased venous pressure reduced also the lymphedema, thus establishing a more normal venous and lymphatic circulation.

It has been shown experimentally that after a vein canalizes following thrombophlebitis, the valves are incompetent. It has also been shown experimentally that when the saphenous valves are incompetent, a high pressure is maintained in that vein during muscular activity, whereas with a normal competent valvular system, exercise reduces the venous pressure. A comparable situation undoubtedly exists in the postthrombotic extremity in which the valves of the deep veins are incompetent. The pressure in the veins under these conditions is far above the colloid osmotic pressure of blood, resulting in an increase in lymph formation. As a result of the previous phlebitis, the lymphatics have been damaged so that they do not function normally in the postthrombotic state.

The induration seen over the inside of the lower leg is believed to be secondary to the increased venous pressure. The brown pigmentation of the skin of this area is due to the capillary hemorrhages also secondary to the increased venous pressure. The varicose veins are thought to be secondary to the incompetent communicating veins which transmit the raised pressures to the saphenous systems. With these thoughts in mind, it is easy to understand how necessary it is to interrupt both the saphenous as well as the superficial femoral veins in order to eliminate both channels that make the increased venous pressure a possibility. Linton has

recommended that the results with the stripping of the saphenous veins are better than when they are merely ligated and injected with a sclerosing solution. It is his thought that with these veins gone, the old channels are much less likely to be opened up. He further states that in his hands lumbar sympathetic blocks are an unsatisfactory approach to this problem, although Alton Oschner does claim success.

The diagnosis of patients suitable for the ligation treatment of this condition is determined by physical examination as well as the history of an attack of thrombophlebitis. The most important part of the examination is to ascertain the competency of the valves of the deep-communicating and superficial venous systems. This is done by the Trendelenburg test. The veins are emptied by elevating the extremity, a rubber tourniquet is applied to the leg just distal to the knee and sufficiently tight to occlude the superficial veins. The patient then stands up. If the superficial veins fill quickly from below the tourniquet, an incompetency is demonstrated in the valves of the deep and communicating veins.

Report of Case

A man, aged forty-eight, gave the story of developing bilateral thrombophlebitis in 1945 during an attack of pericarditis. The first symptom that followed this complication was a persistent swelling that accompanied the original condition. Associated with this were pain and fatigue in his legs on exercise. Walking as little as two blocks never failed to produce considerable discomfort in his calves. Approximately one year after his phlebitis, he noted a gradual enlarging of the superficial veins of both legs. During this postphlebitic period, the symptoms in his left leg have been noticeably worse than the right. With the aid of elastic bandages and stockings he was able to control the swelling, but the subjective symptoms were not markedly altered. During the summer of 1948, approximately three years after his thrombophlebitis, he developed pigmented areas below each malleolus. These were considered to be potential ulcers. Associated with this was an induration of the surrounding subcutaneous tissue with burning and itching of the colored skin.

My first treatment consisted of injecting some of the more dilated varicosities and the application of elastic bandages. The article by Linton and Hardy suggested what seemed to me a rational approach to this problem, for her was a typical case of the postthrombotic syndrome. Accordingly, on December 30 of last year, the patient was subjected to the following operation. Under general anesthesia, the left superficial femoral vein distal to the profunda femoris and upper greater saphenous veins was exposed. The intraluminal pressure of the former after it had been occluded proximally was observed to be 15 centimeters of water. After the saphenous was occluded, it rose to 24 centimeters. If the latter is over 30, it is advised to divide the saphenous at a later date. Accordingly, these veins were divided and ligated. The diameter of the superficial femoral was observed to be approximately 7 millimeters. Following this, all of the larger varicosities were stripped by means of an intraluminal vein stripper. Multiple short incisions were necessary to accomplish this.

The same operation was done on the right side. There was more scarring and fibrosis of the superficial femoral vein than on the left. The lumen was only 2 millimeters in diameter which accounted for my inability to find the lumen with the exploring needle. Consequently, no pressures were taken. It was conjectured at the time that the reason for the fewer symptoms on the right than on the left might be due to smaller caliber of the superficial femoral vein. The superficial varicosities were then stripped on the right side. Pressure dressings were applied from the groins to the metatarsals. The postoperative course was uneventful except for a lymphorrhea that occurred in the right inguinal incision and lasted for nearly four weeks.

The patient states that since the operation his legs feel better than they have at any time since his original attack of thrombophlebitis. The subjective symptoms of fatigue in his calves and burning and itching below the malleoli are gone. The pigmented areas persist, but the induration in the subcutaneous tissues is no longer present. A few rather moderate sized varicosities that were missed in the stripping have enlarged, but they are being satisfactorily handled by injections. There was some residual lymphedema which required elastic bandage support. This has gradually improved until at present his left leg requires no support, but his right will swell slightly without it.

Summary

1. A brief review of the literature on the postthrombotic syndrome is presented.

2. The pathological physiology of this condition is discussed along with the rationale for a proposed method of treatment.

3. A case of the postthrombotic syndrome is presented along with the results of surgical treatment.

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VENOGRAPHY IN THE POSTPHLEBITIC SYNDROME

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Iliofemoral thrombophlebitis is usually followed in months to years by a syndrome characterized by edema, pain, recurrent cellulitis, pigmentation and ulceration. Collectively, this is known as the postphlebitic syndrome.

The pathological physiology of the postphlebitic syndrome and a means by which this may be corrected were set forth by Homans in 1941.[4] He stated that the femoral system once thrombosed must suffer the loss of all its valves so that when the body is erect the venous return must take collateral valved pathways. Blood must pour down a valveless vein, and it is, there-

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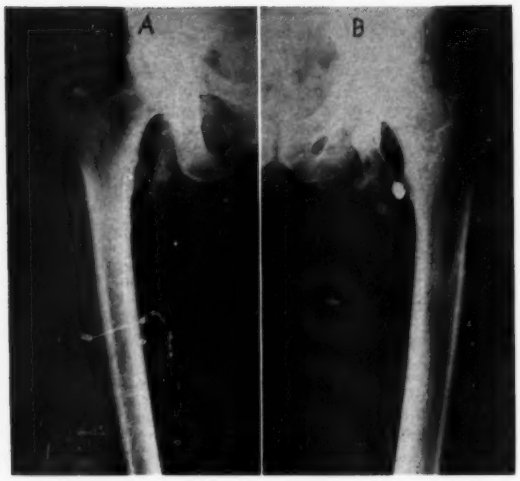

Fig. 1. *A*—Normal femoral venogram, showing a normal valve in the superficial femoral vein and a normal valve in the profunda femoris vein.

B—The superficial femoral vein has been ligated in this patient in the acute stage. The position of injection is shown. Also the competent valves in the saphenous and in the profunda femoris veins are shown.

cannulated the superficial femoral vein directly, after surgical exposure. Radio-opaque material was then introduced into the superficial femoral vein while the patient was in a 45-degree upright position on an x-ray apparatus. X-ray exposures were then made. Bauer was able to show that following an iliofemoral thrombophlebitis in patients with the postphlebitic syndrome, recanalization had taken place in the superficial femoral vein and that the radio-opaque substance would flow downward even into the popliteal vein and occasionally into the veins of the calf. In the normal superficial femoral vein, the material would be held by competent valves and would pass upward. No dye was seen to reflux into the deep veins of the thigh.

We have been able to simplify the technique of direct femoral venography and have been able to demonstrate incompetency in the deep femoral vein as well as in the superficial femoral vein. By means of a popliteal venogram, we have been able to show that many times there exists in the postphlebitic leg a gross communication between the superficial femoral vein and the profunda femoris vein above the knee. Because of these findings, we have thought it to be more logical that ligation of the popliteal instead of the superficial femoral vein be carried out in the postphlebitic syndrome.

Fig. 2. *A*—Femoral venogram, showing reflux into the superficial femoral vein.

B—Popliteal venogram on patient in *A*, showing recanalization of the superficial femoral and profunda femoris veins and showing a gross communication between the superficial femoral vein and profunda femoris vein above the knee.

C—One-minute popliteal venogram, showing presence of opaque material which is evidence of slowing of circulation.

fore, reasonable to assume that an old sclerosed and canalized femoral vein or external iliac vein is better divided.

Bauer[3] was probably the first to demonstrate the pathological physiology of the deep venous system that followed an iliofemoral thrombophlebitis. In 1948, he reported his findings using direct venography. Bauer

The technique used for direct femoral venography is essentially the same as Bauer's, except that a percutaneous entrance into the femoral vein is carried out. Femoral venography is carried out as a diagnostic aid before any operative procedure is decided upon.

The patient is placed on a tilted x-ray table in a 45-degree upright position. After infiltration with novo-

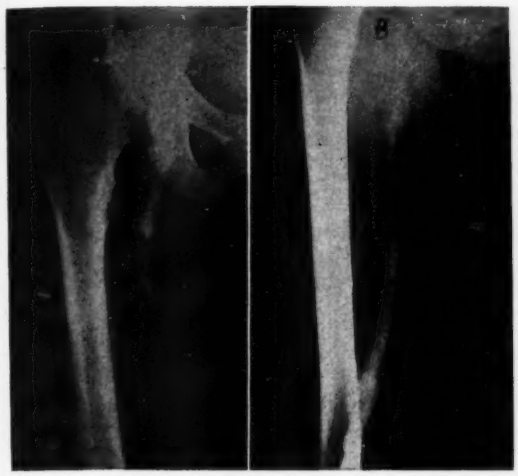

Fig. 3. *A*—Femoral venogram on patient with postphlebitic syndrome but without history of iliofemoral thrombophlebitis. This shows the reflux into a dilated vein and the presence of incompetent valves.

B—Popliteal venogram on patient in *A*, showing gross communication between profunda and superficial femoral veins.

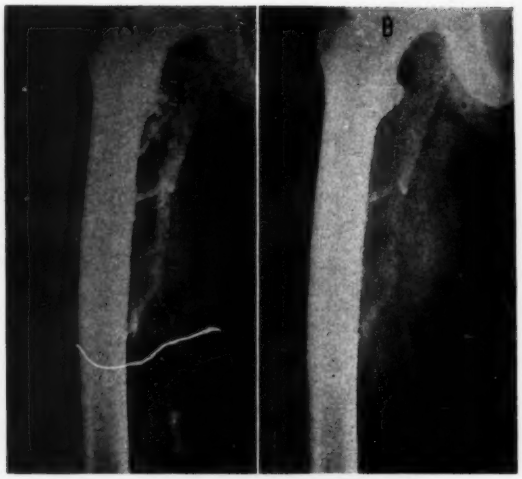

Fig. 4. *A*—Femoral venogram showing reflux into superficial femoral and profunda femoris veins.

B—One-minute film, showing remaining dye in the femoral veins.

Fig. 5—Femoral venogram, showing reflux into profunda femoris vein alone.

caine, a direct puncture is made into a common femoral vein just below the inguinal ligament. A 19-gauge needle is used. Thirty cubic centimeters of 35 per cent diodrast are then injected rapidly. An x-ray exposure is made immediately following the injection, and a second exposure is made one minute later.

The popliteal venogram is carried out in the 54-degree upright position with the patient face downward on the x-ray table. A direct entrance is made into the popliteal vein at the level of the upper border of the patella, and 30 cubic centimeters of 35 per cent diodrast are injected. X-ray exposures are made immediately and one minute following the injection.

Each patient is tested for sensitivity to diodrast before injection. The occular test has been used. In over 100 injections, about 25 per cent of the patients had nausea but only six patients actually vomited following the injection. The nausea is usually completely gone in about three minutes.

We have reached the following conclusions after more than 100 femoral and popliteal venographic studies:

1. In the normally functioning femoral vein, valves are usually present and they will prevent the radio-opaque material from flowing downward (Fig. 1, *A* and *B*).

2. In the normal femoral venogram, the iliac vein is well filled and the one-minute exposure will show a complete absence of radio-opaque material except in the valve sinuses where it will remain for as long as five minutes.

3. In the absence of valves or in a recanalized femoral vein, femoral venography will show that the opaque substance has refluxed into the veins of the thigh, at times even into the veins of the calf (Figs. 2 *A*, 3 *A* and 4 *A*).

4. In patients with the postphlebitic syndrome who show absence or incompetence of the valves, the one-minute exposure will show the presence of the radio-opaque material in the veins of the thigh. The amount remaining depends upon the degree of slowing of the return circulation and the presence of adequate functioning collaterals (Fig. 4*B*).

5. In patients who present the picture of a postphlebitic syndrome without a history of iliofemoral thrombophlebitis, the femoral venogram will show reflux. In these patients, the veins will be seen as a large dilated straight tube without valves. Occasionally, valves are present but are incompetent (Fig. 3 *A*).

6. The profunda femoris vein can be incompetent either alone (Fig. 5) or together with the superficial femoral vein (Fig. 4).

7. By the use of the popliteal venogram, we have been able to show that often there exists a gross communi-

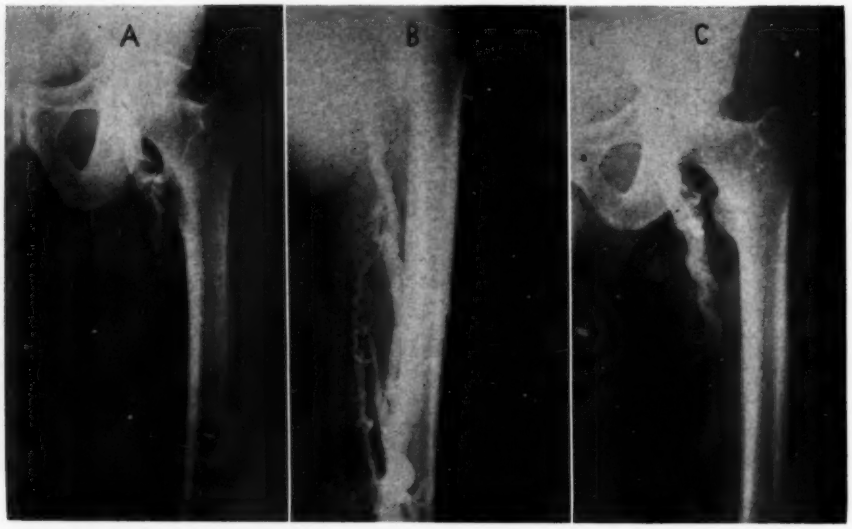

Fig. 6. *A*—Femoral venogram, showing evidence of recanalization in iliac vein and femoral vein. At this time, it was thought that the superficial femoral vein was involved, and a superficial femoral vein ligation was carried out without relief of pain or healing of ulcer in spite of two skin graftings.

B—Popliteal venogram on patient four months after superficial femoral vein ligation. The gross communication between the superficial femoral and profunda femoris is clearly shown.

C—Femoral venogram on patient in *A* and *B*, four months after superficial femoral vein ligation. This shows that the profunda femoris vein is incompetent. A popliteal vein ligation was carried out. A skin graft was then applied to the ulcer which healed well, and the patient had complete relief of pain following the popliteal ligation.

Fig. 7. The incision used to ligate the popliteal vein.

cation between the profunda femoris vein and the superficial femoral vein just above the popliteal space. Ligation of the superficial femoral vein in these patients will not benefit the leg because the pressure is then transferred to the profunda vein which in turn transfers the increased pressure again into the popliteal vein and into the lower leg. This is especially true in patients in whom the profunda vein is incompetent at the time. In this type of patient, ligation of the superficial femoral vein and the profunda femoris vein could be carried out with benefit to the lower leg, but we have found increased edema in the thigh in two patients in whom this was done. The popliteal vein is the logical site of ligation. This will stop the reverse pressure from both the superficial femoral and the profunda femoris vein and will not interfere with collateral channels in the thigh (Figs. 2*B*, 3 *B* and 6 *B*).

8. In the popliteal venogram, as in the femoral venogram, the one-minute film will show the veins of the thigh to be cleared of dye in the normal vein, but still present in the incompetent vein.

Superficial femoral vein ligation for the postphlebitic syndrome was first reported by Buxton[2] in 1944. He found that in many cases ulcers could be healed, but that pain and edema were not uniformly relieved. Linton[5] reported 80 per cent healing of ulcers and 63 per cent relief of pain following ligation of the superficial femoral vein. Glasser[3] reported one recurrence of ulcer in six patients who were followed for five years following

a superficial femoral vein ligation for the postphlebitic syndrome. However, he reports a 50 per cent recurrence in those followed for only two years. Bauer[1] reports relief of pain and healing of ulcers in all patients following ligation of the popliteal vein. Our results following popliteal vein ligation compare closely with those found by Bauer. However, our longest follow-up has been only eight months. Relief of pain following the ligation is dramatic in those patients who give a history of a pressure pain and in whom reflux is shown by venographic studies.

Together with the popliteal vein ligation, we have ligated and stripped, with the intraluminal vein stripper, all patients who had an incompetent saphenous system. Superficial varicosities that remained were then treated by injections.

Summary

The technique of direct femoral venography and popliteal venography and the findings as they refer to the postphlebitic syndrome are presented. Incompetency of the valves of the femoral venous system accounts for a large part of the postphlebitic syndrome. Not only can the superficial femoral vein be incompetent alone, but the pathologic physiology may extend into the profunda femoris vein as well. The femoral venogram is used to study this pathological physiology. By means of the popliteal venogram, the anatomy of the venous system of the thigh can be studied, and it has been found that in a large number of cases there exists a gross communication between the superficial femoral vein and the profunda femoris vein just above the popliteal space. Because of the venographic findings, we have felt that a popliteal vein ligation should be performed in preference to the superficial femoral vein ligation in the postphlebitic syndrome. Results have been encouraging, especially in relief of pain and healing of ulcers.

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THE RETURN OF "VEIN STRIPPING"

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Ligation and retrograde injection are currently the most widely used method of treating varicose veins. Quite recently the so-called "stripping procedure," a method used many years ago, is gaining popularity. The current method of treatment was preceded by many frustrating efforts in other avenues.

Fig. 1.

Throughout the ages, many procedures such as ligation, incision, excision, cautery, bleeding, compression sutures, etc., were suggested, tried and abandoned.

Around 1850 attempts were made to obliterate varicose veins by injection alone. Unsatisfactory fluids for injection purposes plus the lack of understanding of the fundamental physio-pathologic condition at fault, doomed this form of therapy to failure.

From 1880 to the early twenties, it was the vogue to do extremely radical procedures. It would seem that the symptoms sometimes did not warrant such extreme measures. Schede made multiple circular incisions down to the fascia from the groin to the calf, ligating all veins encountered. In 1884, Modelung[8] extirpated the entire saphenous vein through a long vertical incision from the groin to the ankle. In 1908, Friedel[4] described a long spiral incision from the groin downward, encircling the leg several times, packed wide open and allowed to granulate. Needless to say, the "vein stripping" procedure as introduced by Mayo[9] in 1906 and by Babcock[2] in 1907, were accompanied by too many complications. With the other radical procedures, it was abandoned as soon as a safer procedure was available.

The procedure became available in 1916 when John Homan[6] described the reverse flow phenomena in the saphenous vein, designated the saphenofemoral junction as the proper site of ligation and stressed ligation of all collateral branches. The operation is today performed as he described it in 1916. Further refinement was added in 1930 when Higgins and Kettel developed "sodium morrhuate" for retrograde injection. This was the first solution available with a high sclerotic index and yet relatively safe for the patient.

Gradually, then, a simple procedure evolved, easily performed with a high degree of effectiveness and a relatively low incidence of complications. It was to be expected that the ligation-retrograde injection technique quickly caught the fancy of all surgeons and has been done the past three decades almost to the exclusion of all other methods.

Fig. 2.

Fig. 3.

Thus we have gone through many phases and find ourselves repeating the cycle again by reviving one of the older, more radical procedures, namely, the "stripping" procedure. Why is this procedure being revived? Is it now a safer operation than it was in 1910? Is it a more effective operation, associated with fewer recurrences than the conventional ligation injection technique?

The "stripping" procedure is unquestionably safer than it was between 1910 and 1920. During that period the patients were left in bed for one to two weeks. They are now ambulated the evening of operation. The extensive openings into tissue planes are not as hazardous with better surgical and operating room care and with the antibiotics as adjuncts. Whereas the thromboembolic complications were quite common in the earlier days of "stripping," they are almost unknown today, and the availability of anticoagulants leaves one much more secure as to this complication. In approximately 200 cases of "stripping" at the Minneapolis Veterans Hospital, only one questionable case of calf phlebitis was observed and no embolic phenomena.

It is apparent that one should have a two-year follow-up to determine recurrences in varicose veins. It is our impression, however, that the recurrence rate is definitely less with the "stripping" than with the conventional methods. Hodge et al,[5] Stalker,[13] Linton[7] and McElwee and Maisel[10] now prefer to treat varicose veins by "stripping."

Some space should be devoted to the dangers of retrograde injections with the conventional method of handling varicose veins. This hazard, of course, is not present when the veins are "stripped." Hodge,[5] Slevin,[12] Atlas,[1] Witter,[14] and Boyd and Robertson[3] do not use retrograde injections because of the dangers of introducing a deep phlebitis. When the vein only is ligated, one has done a rather incomplete operation. Boyd, et al[3] and McPheeters[11] have both demonstrated the presence of the radiopaque material in the femoral vein quite soon after it was injected into the superficial saphenous vein. One is then depending upon the size and rate of flow in the deep vein to prevent or minimize the phlebitis. I have been particularly impressed in obtaining a history in the long-standing post-phlebitic syndromes that many of these people unequivocally volunteered that the symptoms of their deep vein involvement gradually began after superficial vein ligation and retrograde injection. Figure 1 demonstrates the amount of dye that sometimes passes immediately into the deep circulation after being injected into the distal end of the divided saphenous vein. When the injected material is an irritating solution, it is obvious that deep vein damage can result.

Indications for stripping are variable. I believe the following would be acceptable in any quarter:

1. Extremely large veins (Fig. 2).
2. Inactive deep phlebitis with incompetent superficial veins (Fig. 3).
3. Multiple previous injections.
4. Recurrence following previous adequate ligations and retrograde injection.

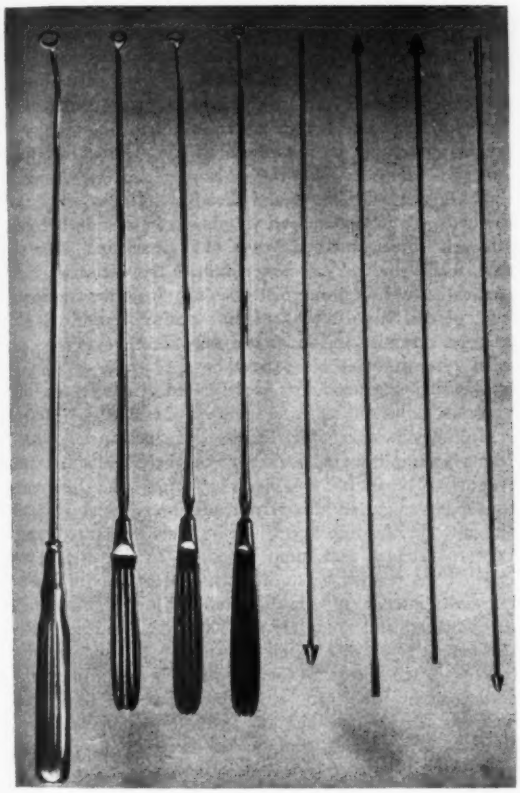

Fig. 4.

In my own private work, however, I go beyond the above indications and use the "stripping" procedure almost to the exclusion of all other methods. To date, I have been satisfied with the immediate and late results.

Technique

A question of technique in this procedure always begins with the type of "stripper" used. We have been satisfied with the Babcock intraluminal stripper with the occasional use of a small Mayo extraluminal stripper for small tributaries (Fig. 4). Several other types of instruments with various innovations are available. Of these the Myers stripper, devised by Dr. Tom Myers of Rochester, Minnesota, is an excellent intraluminal stripper. It permits one to strip the vein upward from the ankle to the divided segment in the groin. An adequate ligation of the saphenous vein at the juncture with the femoral vein, including all collateral branches, is mandatory. The saphenofemoral juncture should be clearly dissected and the femoral vein clearly identified completely around the juncture. Stripping of the distal segment proceeds according to the individual technique. The patient should always be placed on the operating table in slight Trendelenburg position. This so lowers the pressure in the femoral vein that the torn ends of the communicators bleed into the femoral vein lumen rather than into the subcutaneous tissues. One is amazed often at the minimal bleeding encountered from this procedure which appears on the surface so traumatic. In stripping the distal segment of the saphenous vein from the groin, one can often go to the ankle and withdraw the vein in one long segment. Sometimes, a communicator at the knee traps the tip of the stripper, and one has to divide the vein here and proceed again. With open ulcers at the ankle, one should strip down to the ulcer if possible. The ulcer does not have to be healed, but should be free from infection and covered by clean granulations.

With the patient still in Trendelenburg position at the completion of the procedure, two longitudinal folded towels are incorporated as pressure dressings over the bed of the excised saphenous vein by using two 4-inch Ace bandages from ankle to groin over the towels. The patient walks the evening of the operation. He is given a daily dose of procaine penicillin and can be dismissed in one or two days. With proper care regarding subcutaneous bleeding these patients have remarkably little post-operative disability. They are much more comfortable than following a retrograde injection of one of the sclerosing solutions.

Postoperatively, these patients must be followed until all residual veins are obliterated by office injections. These are not started for one month because often an enlarged residual vein is actually filled with soft clot and in a few weeks will begin to contract down. These patients on an average will require fewer postoperative injections than following other procedures. Often they require not a single injection, but are all instructed to return for routine six-month check-up and at periodic intervals thereafter.

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FUNDAMENTAL PRINCIPLES IN THE TREATMENT OF VARICOSE VEINS

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One often hears this complaint: "There is so much confusion and contradictory advice about vascular conditions that it is impossible for the average doctor to know what is best for his patient." It is my purpose to emphasize that there is general agreement on basic, fundamental principles, and these fundamental principles are very simple and easily understood. The differences of opinion are chiefly as regards which of two or more procedures will produce the best results.

There is general agreement that heredity and phlebitis are probably the two most important etiological factors in the development of varicose veins. Any varicose vein, whether degenerative or postphlebitic, can be eradicated, but the tendency to form new veins will still be present. This tendency to form new veins can be modified by proper care, but cannot be eliminated. Any doctor who accepts a patient with this tendency and eliminates the existing veins has only fired the opening gun in a war that will last as long as the patient lives. The patient must thoroughly understand, before any treatment is started, that there are several different types of treatment but that none of them is perfect; that regardless of which type of treatment is used, he will need regular care, in the average case once a year, as long as he lives. Help him to understand by explaining that it is exactly the same type of continued deterioration that requires his going to the dentist at regular intervals.

There is general agreement on the fundamental principles of treatment of superficial varicose veins. Small veins can be destroyed by injection of a sclerosing solution. Larger veins, especially those veins which are subjected to considerable intravenous pressure, are best treated operatively and here again there is important agreement. The two essentials are, first, a high ligation, and second, destruction or removal of the varicosed segments. I am speaking about superficial veins. I believe that judgment on the femoral and popliteal vein ligations should be held in reserve until we see how long the good results last. In those deep vein ligations, a fundamental principle is violated; the distal segment is not eradicated.

There are three generally accepted groups or types of varicose vein surgery: (1) high ligation plus stripping; (2) high ligation plus multiple incisions for ligation of perforators; and (3) high ligation plus retrograde injection.

All three groups have a high ligation as an essential part. Any one of the three types of treatment fails if the long saphenous vein is not ligated proximal to the tributaries that join it very close to the femoral vein. I am sure that this is the most common cause of failure. The only way one can be sure he is ligating proximal to these tributaries is to continue the dissection until he can ligate the saphenous flush at the junction with the femoral.

The second essential of varicose vein surgery, after high ligation has been completed, is the destruction or removal of the remaining varicose segments. This can be accomplished by three or more methods. No one method is ideal or perfect. Stripping works well if the veins are straight and tubelike. Retrograde injection is better if the veins are extremely tortuous. Separate incisions for ligation of incompetent perforators may be indicated even in the extremity having one of the above-mentioned types of treatment. Injections of sclerosing agent, to eliminate remaining varices, can be used as a follow-up treatment, regardless of the type of original surgery.

There are advantages and disadvantages in all three methods. I do not believe we should be committed exclusively to one method but should determine, in each case, which method will best eliminate the varices in that particular case. An internist does not prescribe the same kind of diet for all his patients; neither should a vein surgeon commit himself to one procedure, regardless of what type of veins his patient has.

The stripping procedure is described elsewhere on the program.

Multiple incisions for ligation of incompetent perforators are advocated and described by Sherman in the August 1949 issue of *Annals of Surgery*. Sherman uses a high ligation plus retrograde injection of a small amount of sclerosing agent, but he feels that this "often fails to produce maximum benefits." In an attempt to improve his results, he studied the anatomy of the lower extremity intensively. He dissected 229 lower extremities on cadavers, and made about 1500 radical surgical dissections. From these extensive studies, he came to the conclusion that there are perforator veins, at fairly uniform locations, that can become incompetent. He advises multiple incisions for ligation of these incompetent perforators, emphasizing that, to be successful, such ligations must be made deep under the fascia, deep in the muscle, if possible at the junction with a major vessel of the deep venous system. He describes the stripping procedure as "futile," because it leaves the collateral and accessory perforator veins undisturbed. "The reflux of blood through the incompetent leg perforators is not altered, and the procedure fails to accomplish its purpose." He finds from one to fourteen incompetent perforators in a single leg. Seven mild embolisms occurred in his series. His operative time for one extremity is three hours.

Obviously, his system is not ideal for several reasons.

1. A general anesthetic is required and active motion cannot start until the anesthetic wears off.

2. Numerous scars constitute a cosmetic objection.

3. At least in our experience, what appears to be a perforator often turns out to be just a dilated vein.

4. Any surgical procedure that takes an experienced specialist three hours for one leg will require a longer time for a surgeon who does that procedure only occasionally. In other words, a patient with bilateral varicose veins will require perhaps 6 or 8 hours for the average surgeon, exclusive of preoperative study and postoperative care.

The third, and I believe one of the best methods, is high ligation with retrograde injection. With teamwork, the patient with bilateral varicose veins can be operated upon in one hour. Only local anesthesia is necessary, and the patient is ambulatory immediately. Fast walking at frequent intervals is essential; it increases the safety and decreases the discomfort. The majority of these patients do not require a hospital bed and this, combined with the shorter time required for operation, makes the procedure less expensive. Dr. McPheeters can look back on several thousand consecutive ligations without a fatality or even a proven embolus. Gunnar Bauer, during his recent visit here, stated that he favors this method. It should be noted that if the surgeon suspects the presence of one or two incompetent perforators, he can easily care for them by novocaine infiltrations and a secondary incision immediately following the regular procedure. The retrograde injection can be made more effective by means of the "empty vein technique" in which the extremity is first elevated to drain the blood from the leg into the abdomen. Then, as the leg is lowered and the table is tilted so the patient's body is partially upright, the retrograde injection is made and gravity helps the solution go toward the foot. We are often able to get obliteration of varicose veins in the lower calf and ankle by this empty vein technique, and we believe it eliminates the need for the ureteral catheter sometimes employed to get the solution into the lower leg.

This retrograde injection method also is not perfect for several reasons.

1. The chemical phlebitis causes pain and soreness for several days.

2. A thin-walled vein, close to the skin, may produce a pigmentation. This can be minimized by draining pocketed areas of half clotted blood and by supportive bandaging to compress such veins.

3. Any sclerosing agent can cause an allergic reaction in a sensitized patient, varying from a mild urticaria to severe shock. It is wise to have ready an emergency box, with adrenalin, aminophyllin, anti-histaminics, et cetera.

4. The sclerosing solution, conceivably, could precipitate an acute phlebitis, especially if the patient has a thrombotic tendency. It should be used with care in any patient with a history of phlebitis, and not used at all, if the phlebitis is still active. But there is no justification for any doctor's telling a phlebitis patient "never let any doctor touch that leg." We repeatedly see large, foul-smelling, painful ulcers that have been present on swollen, pigmented legs, for months and sometimes years, because of a very positive order from the attending doctor: "Don't ever let any doctor touch that leg; if you do, you will probably lose the leg and perhaps lose your life."

Just as bad is another almost unbelievable order, "Never put an elastic bandage on that leg." These two instructions are probably based on the supposition that the deep venous system has been closed by the phlebitis, and that it stayed closed. That is not correct. Intravascular clotting in an artery seldom recanalizes, but in a vein it often does so. The obstruction of the deep phlebitis is temporarily compensated for by dilated, superficial veins, but within a few months a new canal in the deep vein can make the dilated superficial veins a liability instead of an asset. These dilated or varicosed veins then need at least conservative management. In that term is included three things: (1) activity; (2) occasional elevation during the day, and (3) supportive bandaging. It is advisable that patients with varicose vein tendency should lead an active rather than a sedentary life. A quick contraction of the calf muscles, such as occurs in walking briskly, will force the blood upward; thus the calf muscles act like a second heart, helping the return flow of blood to the trunk. Prolonged standing or sitting in one position such as occurs among dentists, barbers, elevator operators and streetcar motormen is not good. Edema gradually develops late in the day. The condition is usually progressive, and as time goes by the patient finds he develops the swelling earlier and earlier during the day. Also, it disappears less completely at night. This edema is a danger signal. If there is one fundamental principle that is generally agreed upon, it is this: edema is detrimental and must be prevented if possible. It is advisable for patients with a varicose vein tendency to lie down and elevate their legs at least twice a day. The length of the elevated period varies from five minutes to an hour, depending on the severity of the condition. While the legs are elevated above the level of the heart, gravity will help the return flow of blood, and the swelling should disappear. We advise our patients to examine their ankles each night at bedtime. If there is any swelling, it is a warning signal. If swelling has developed in spite of activity, and in spite of regular leg elevation, an elastic supportive bandage should be worn at least part time. "Wrap around" bandages give better support than the stocking type. They should be 4 inches wide for the average leg; a 2-inch width is almost useless. They must be applied snug enough to give firm pressure. Stasis is even more important if the patient becomes ill or is confined to bed for any reason. Blood flowing slowly through a vessel is much more likely to clot than blood flowing rapidly. Frequent motion, especially of the lower extremities, will increase the rate of blood flow and decrease the possibility of phlebitis and embolism. Many hospitals have established vascular committees to recommend routine measures and emergency procedures for vascular complications. Such a committee can make a detailed study of each complication that occurs, and be ready to make suggestions when the case is discussed at the monthly staff conference.

There is one very important consideration that should be emphasized. A patient with varicose veins has a progressive condition. Those patients in the late forty-year-old and early fifty-year-old groups, especially, tend to become worse and to develop complications. Some of them, on first examination, seem to need only conservative management, but, in view of the progressive nature of their disease, actually require radical treatment. The admittedly imperfect treatment for varicose veins must aim not only to relieve the symptoms now present but also to prevent more serious trouble in the future. In weighing the merits and the possibilities of each type of treatment, we must consider not only the immediate improvement but the duration of that im-

provement. How good will that leg be twenty-five years from now?

In conclusion, I would like to emphasize these points:

1. We can destroy any vein we can reach, but there is still no method by which we can prevent new veins from forming. This tendency to form new varicose veins makes regular follow-up care imperative, regardless of the type of treatment.

2. The essential feature of the surgical treatment of varicose veins is a good, high ligation. The dilated segment distal to the ligation can be destroyed or eliminated by several methods, each of which has advantages and disadvantages that should be considered in the light of the requirements of each individual case.

3. Stasis and edema are dangerous and detrimental. The co-operation of the patient in wearing supportive bandages and frequently contracting the calf muscles will minimize the dangers.

4. The "empty vein technique" for either retrograde injection or follow-up office injection allows greater concentration of the sclerosing agent and gives better results.

5. Untreated varicose veins become progressively worse. Treatment should not only relieve present symptoms but should also prevent future trouble. It is preventive medicine.

RESUME OF PRESENT-DAY CARE AND TREATMENT OF VARICOSE VEINS AND THEIR COMPLICATIONS

H. O. McPHEETERS, M.D.
Minneapolis, Minnesota

It certainly must be apparent by this time that the proper method of treating varicose veins is anything but a settled one. It would seem that such a common clinical disturbance would lend itself to the rapid development of a perfect, simple and complete cure. Such is not the case. A review of the medical literature of the past year shows that an article on some phase of the problem appeared in almost every journal published. After having cared for 25,000 varicose vein patients and having done ligations with retrograde injections on 6,400 of these patients, I have not yet settled on the right method. Because of this unsettled state of affairs and knowing that all new ideas on this subject are supposed to originate in the East, I arranged for a personal visit to Boston and spent four days with Dr. R. R. Linton, one day with Dr. Gerald Pratt in New York and one day in Chicago. After all the discussion generated by such a trip in addition to my own experience, I have now formed some very definite conclusions.

As Dr. Alexander has so clearly said, there are basic fundamentals in this treatment on which we all do agree.

We must accept the fact that this is a degenerative process developing as the years pass by and that our patients will have more varicose veins regardless of what method of treatment is used or how thoroughly it is carried out.

At the risk of repetition, I want to emphasize the fact that today all authorities agree that a definite reverse flow of blood has developed in any well-advanced and extensive case of varicose veins, and that any successful treatment must seek to check this at its source, wherever that may be.

As the other speakers have pointed out, this reverse flow of blood usually begins at the sapheno-femoral junction. This means *at* the junction and not 3 inches or 2 inches or even one-half inch below. The most common cause of failure in this work is the lack of appreciation of this fact. It is true that in many cases a simple ligation of the great saphenous vein may hold the process in check for a while, even without injections. Yet, it is also true that there is a large variation in the arrangement of the tributaries or branches of the saphenous vein near the foramen and that the reverse flow may develop through any of these as well as, or in addition to, the main saphenous vein itself. If this is true, then the ligation must be *above* all these tributaries and flush with the wall of the femoral vein, if we hope for a good result. As Dr. Sherman has pointed out in his classical dissections, there are many communicating branches throughout the entire leg, and a recurrence may develop through these, even though a high ligation has been well done. It is with the idea of closing these communicating veins that I have done my retrograde injections, while other men chose to remove the saphenous vein in one way or another. Sherman does the high ligation and injects sodium morrhuate distally and then proceeds to do his dissection. At times he injects the veins in the lower leg several days preoperatively. He says that this all lessens the hemorrhage at the time of dissection. He may spend three hours on the dissection of one leg and often four hours on a bilateral. His dissection is carried out with spreading dissection and incisions down the leg. Few men use the Mayo stripper any more. The Babcock stripper is also being replaced by the more flexible type, the Linton and Meyers.

I believe the best stripping is done by Linton and his students. He uses a soft, flexible intraluminal wire and strips or pulls out all the varicosed segments he can find. He does both the long and short saphenous veins at the same time. If the short saphenous is varicosed, he carries the stripping right down to the ankle. Many times the vein will be found to go directly under the old ulcer, or at the foot internally or externally directly into an open ulcer.

The stripping is carried out under pentothal or spinal anesthesia by preference. The table is tilted to 10 to 15 degrees. The Trendelenburg position is utilized during the operation, and there is but little hemorrhage. Postoperative pads are bandaged along the course of the stripped veins and an ace or adhesive bandage wrapped

about the entire stripped area. The foot of the bed is raised on shock blocks, with each leg on a pillow. The legs are kept so for two days. The patient is told to get up and start walking twelve hours postoperative and at two-hour intervals after that. When not walking, the legs are supposed to be elevated. The bandages are removed on the fourth day and continued after that on the lower leg, only as long as the legs swell. The absence of postspinal headaches is attributed to the small needle used, 22 gauge, and the technique as well as the small amount used (12 mg. of Pontocaine, as a rule).

After having done 6,400 varicose vein ligations with retrograde injections of the sclerosing solution, I admit that the retrograde injection following the high ligation falls short of perfection in that the communicating veins in the large and extensive cases cannot be adequately, completely and permanently closed. They often recanalize and become the source of a recurrence or a new varicose vein development. If the vein in the superficial fat is torn off and removed, this cannot happen. When sufficient sclerosing solution is injected to sclerose the vein well, the chemical phlebitis that develops is so severe and painful in the extensive case with large varices, that the patient is almost incapacitated. The veins are so sore, the patient can hardly walk, and yet he must walk to avoid emboli. As the large thrombosed segments liquefy, they must be drained or the soreness will persist, the pigmentation will be severe, and they will be the source of new varicose veins. For these reasons, I believe the thorough stripping is the best procedure in all the extensive cases, and because of the extensive collaterals I plan to use it for all bad cases of the short saphenous group. I have seen many cases of varicose veins in patients who have been stripped, but there should be fewer varices develop subsequently in any patient well ligated and stripped than by any other method.

I hardly feel able to comment on the work of Dr. Kusz because he is so far ahead of the field that I have not caught up with him as yet. Much of it is very logical. It follows the ideas of Homans and Bauer. It was Homans, you will remember, who first was rash enough to suggest the ligation of the femoral vein for this reflux flow in the femoral vein years ago. His slides are beautiful and the result of much effort. I have seen some of his fine results. I am eager to see how they are five years from now. That will be the answer. He must surely be congratulated on his fine work.

Dr. Plimpton is to be congratulated on his excellent discussion of thrombophlebitis. His résumé of the literature is very comprehensive.

In cases of an acute thrombophlebitis of extensive large superficial varicose veins, Dr. Linton prefers to excise the entire inflamed mass and then do a high sapheno-femoral ligation. Most men prefer to put the patient to bed with the application of extensive hot wet packs applied locally. The patient should continue to walk briefly twice daily. Anticoagulants should be given and the prothrombin percentage should be kept down about 35 per cent of normal. One never needs to fear a hemorrhage at that level. I have had two patients in whom the phlebitis extended to the femoroiliac region where I did not use the anticoagulants. Dicumarol is sufficient.

Most men agree with the idea and use of the lumbar sympathetic block for any severe case of deep phlebitis with the resultant edema, cyanosis and cold foot. This should be used early and there should be no delay for several days or weeks. It should be repeated at twenty-four-hour intervals, if needed, to keep the leg and foot warm and dry. Many times I have seen it give much help, even though not used for several weeks after the onset of the phlebitis. In cases having a history of a severe deep phlebitis years before, I often use the block to see if any help could be expected following a sympathectomy. There is no point in using a block for the swollen but warm and dry leg and foot. It will not help. Linton does not advise a sympathectomy for the postphlebitic case. In his experience, the immediate good result has disappeared in two years. I cannot agree with this. Homans has urged a sympathectomy for the old postphlebitic with extensive dermatitis over a cold and clammy lower leg and foot. The ligation of the femoral or popliteal vein may give additional help. Time alone will tell.

I cannot urge too strongly the use of the routine, hot, wet pack for all these cases. Drinker has definitely shown that the hotter the pack to the point of tolerance, the more relaxation of the vessels and the greater the lymphatic drainage. The patient will not get burned if the blankets are wrung dry as with the Kenny pack for poliomyelitis, but they must not be put on with the cloths soaked and sopping wet.

BLUE CROSS PAYS MILLIONS TO HOSPITALS

Nearly a hundred million dollars, representing more than 88 per cent of income, was paid to hospitals by the voluntary, non-profit Blue Cross Plans for care of members during the first quarter of 1950, Richard M. Jones, Chicago, director, Blue Cross Commission of the American Hospital Association, recently announced

From a total income of $109,801,301, the ninety Blue Cross Plans of the United States and Canada paid $96,989,972 for member's care and used only $9,184,564 (8.37 per cent) for operating expenses.

There are more than 38,000,000 persons enrolled in the Blue Cross Plans in the United States and Canada, representing more than 24 per cent of the United States population and 21 per cent of the Canadian people.

In Memoriam

RALPH CRAWE ADAMS

Dr. Ralph C. Adams, a practitioner at Bird Island since 1906, died April 25, 1950. He was seventy years of age.

Dr. Adams was born at Utica, Pennsylvania, June 7, 1879. He was a graduate of Jefferson Medical College, Philadelphia, having received his M.D. in 1906.

Dr. Adams is survived by his wife, Hertha; a son, Jack, who is in the military service; a daughter, Margaret, of Denver, Colorado, and two sisters.

FREDERICK H. ROLLINS

Dr. F. H. Rollins, a prominent practitioner at St. Charles, Minnesota, since 1898, died at Rochester April 27, 1950, after a brief illness.

Dr. Rollins was born near Caledonia, Minnesota, September 30, 1867. He graduated from Rush Medical College in 1897 and practiced for a year in South Dakota before locating at St. Charles.

During World War I, Dr. Rollins served as commanding officer of a convalescent camp base hospital in France. He served as state senator from 1928 to 1934. He was a member of the Masonic Order and of the Order of Eastern Star.

Dr. Rollins is survived by his wife, Mary, two sons, Keith of Chicago and Pat of Minneapolis; one daughter, Mrs. C. D. (Margaret) Thompson of Chicago; and one stepson, Murray Olsen of Rock Rapids, Iowa.

Dr. Rollins was honored at a civic dinner in St. Charles in May, 1947, on the occasion of his fiftieth anniversary as a practicing physician. All his life he was an ardent fisherman and hunter and was most active in a variety of community projects.

CHARLES L. SCOFIELD

Dr. C. L. Scofield of Benson, Minnesota, died April 23, 1950, at the age of eighty-five years. He was born on a farm in Cannon Falls, Minnesota, on April 16, 1865, and in all of the years of his life he showed the results of his early background in his fine attitude towards the people among whom he practiced. He graduated from the University of Iowa in 1886 and began his practice in Saint Paul the same year but in 1890 he moved to the town of Benson where he practiced up to the time when he suffered a cerebral hemorrhage on March 29, 1947.

He had his first office in the Security State Bank building, and in 1900 he moved to the Colby block where he practiced until he built his own office building a number of years after that.

Dr. Scofield was almost a legend in the entire area surrounding Benson. He was truly the old type of country doctor braving the blizzards and winter weather and driving many miles with horse and buggy. No family was too lowly to receive administrations, at his hands, when he was called.

In 1936, when he completed fifty years in the practice of medicine, a testimonial banquet was given at which he was honored for the fine medical practice which he had carried on. Practically everyone who assisted in putting on the dinner had been brought into the world through his help.

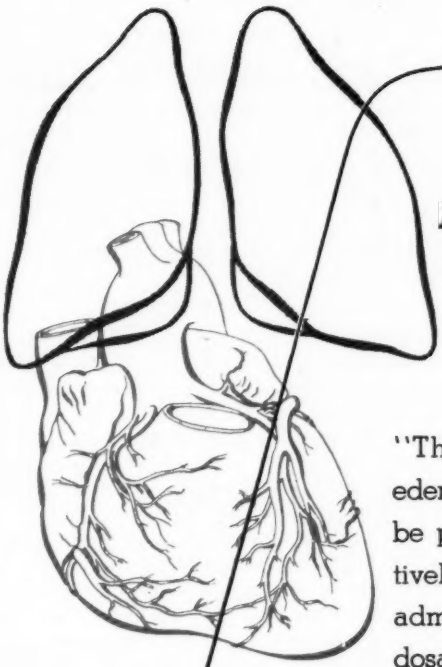
His fine attitude towards the public is shown by the fact that during his lifetime he was elected President of the first council; he was a long time member of the School Board; he was for years Chairman of the City Park Board; and was made Chairman of the Charter Commission which drew up the Charter for Benson, making it a city in 1908. At one time he was a member of the volunteer fire department, the manager of the baseball team and for many years was Chairman of the Board of Directors of the Benson Cemetery Association.

He took an active part in the business life of the city. He was at one time President of the Swift County Telephone Company and Security State Bank. He was a member of the Sons of the American Revolution; belonged to the Swift Lodge No. 129, A.F. & A.M.; and the Modern Woodmen of America, the AOUW, the Knights of Pythias, the Isaak Walton League, and the Woodmen of the World. His interest in children and young people in his home town shows him as Chairman of both the District and Local Boy Scout committees for several years. His interest in the early history of Swift County finds him the organizer and President of the Swift County Historical Society. His activities were not limited to the locality in which he lived but we find his honors coming from statewide organizations. In October, 1948, we find him awarded an honorary membership in the Minnesota Public Health Conference for distinguished service in public health. He served several years as president of the Swift County Health Association and helped organize the Minnesota Public Health Association and was its president from 1919 to 1923.

He was a member of the State Tuberculosis Commission and was most active in the various tuberculosis committees in the Minnesota State Medical Association. He was a member of the Kandiyohi-Swift-Meeker Medical Society of which he was secretary for approximately twenty-five years, and a member of the Minnesota State Medical Association of which he was at one time vice president. He was a member of the American Medical Association. He was a Great Northern Railroad surgeon for forty-five years, and in 1936 he received a life membership in the Great Northern Veterans Association. He was a lifetime member of the Pilgrim Congregational Church of Benson, and a member of the building committee which had charge of the erecting of the beautiful church edifice which houses this congregation.

He is survived by his wife, Mrs. Bertha Scofield, together with four grandchildren.

(Continued on Page 632)



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1. Barach, A. L.: Edema of the Lungs, Am. Pract. 3:27 (Sept.) 1948.

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CHARLES L. SCOFIELD

(Continued from Page 630)

Charles L. Scofield was a man of unusual talents, revered by all for his good works, and in his passing, those of us who knew him well feel a deep sense of loss and a keen hope that we may carry on in some manner the fine impressions which he made on the lives of us all. He was the finest type of American citizen, an honor to his profession, and a friend to all—truly a man among men.—B. J. BRANTON, M.D.

NELS WESTBY

Dr. Nels Westby, well-known and highly esteemed physician of Madison, Minnesota, died April 21, 1950, following a heart attack. He observed his sixty-fourth birthday the day before his death.

Dr. Westby was born April 20, 1886 in Brown County, South Dakota. He attended Augustana Academy in Canton, South Dakota, the University of Minnesota and St. Olaf College, where he graduated in 1909.

On August 29, 1909 he was married to Gusta Locken, and to this union eight children were born.

Dr. Westby received his medical degree from Cornell Medical College in New York in 1913 and served his internship at the Methodist Hospital in Brooklyn, New York.

In January, 1915, he entered into partnership with Dr. W. N. Lee in the Madison Clinic and became chief of staff of Ebenezer Hospital.

Dr. Westby was a member of the Camp Release Medical Society, the Minnesota State Medical Association and the American Medical Association. He was a Fellow of the American College of Surgeons and had recently been appointed to the National Christian Medical Society. He was mayor of Madison, had been a member of the Board of Education School District No. 74 since 1927, and was the present chairman. He was a charter member of the local Kiwanis Club.

Dr. Westby had served as trustee and deacon of the Madison Lutheran church. He served as president of the Brotherhood of the Evangelical Lutheran church in its formative years and had been a member of the Church Council of the Evangelical Lutheran church for the Southern Minnesota District.

He is survived by his wife, Gusta, one son, Norval, and five daughters: Mrs. Aubrey Edmonds of Grand Marais, Minnesota; Mrs. Norris Skogerboe of Brooklyn, New York; Mrs. Gunnar Pederson of Saint Paul; Mrs. Max Barzee of Moro, Oregon; Mrs. William Gualtieri, and Mary Westby, both of Madison.

One of the most persistently discouraging facts about cancer of the lung, is the long interval of ten months that elapses, on the average, between the patient's first visit to the doctor and the time when the diagnosis is made.—OVERHOLT, R. H., and SCHMIDT, I. C., *New England J. Med.*, Nov., 1949.

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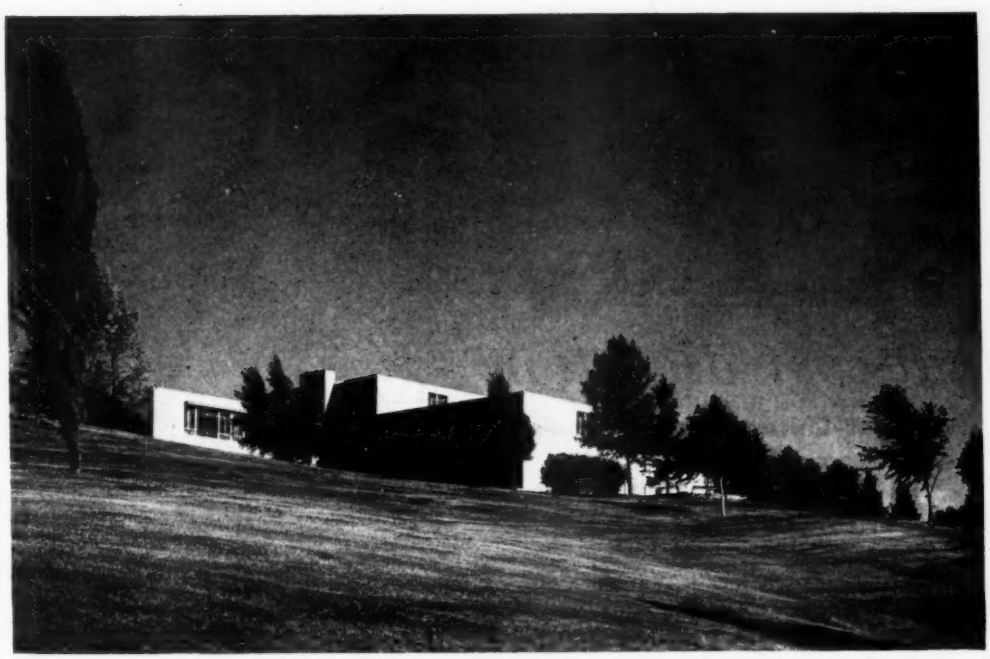

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AMERICAN CONGRESS OF PHYSICAL MEDICINE

The American Congress of Physical Medicine will hold its twenty-eighth annual scientific and clinical session August 28, 29, 30, 31 and September 1 at the Hotel Statler, Boston, Massachusetts. All sessions will be open to members of the medical profession in good standing with the American Medical Association. In addition to the scientific sessions, the annual instruction seminars will be held August 28, 29, 30 and 31. These seminars will be offered in two groups. One set of ten lectures will consist of basic subjects and attendance will be limited to physicians. One set of ten lectures will be more general in character and will be open to physicians as well as to therapists, who are registered with the American Registry of Physical Therapy Technicians or the American Occupational Therapy Association. Full information may be obtained by writing to the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians will conduct its 32nd Annual Session at St. Louis, Mo., April 9-13, inclusive, 1951. Dr. Ralph Kinsella of St. Louis is the general chairman and will be responsible for local arrangements and for the program of clinics and panel discussions. Dr. William S. Middleton, president of the College, Madison, Wis., will be in charge of the program of morning lectures and afternoon general sessions.

Secretaries of medical societies are especially asked to note these dates and, in arranging meeting dates of their societies, to avoid conflicts with the College meeting for obvious mutual benefits.

AWARD FOR RESEARCH IN INFERTILITY

The American Society for the Study of Sterility offers an annual award of $1,000 known as the Ortho Award, for an outstanding contribution to the subject of infertility and sterility. Competition is open to those in clinical practice as well as individuals whose work is restricted to research in the basic sciences. Essays submitted for the 1951 contest must be received not later than March 1, 1951. The prize essay will appear on the program of the 1951 meeting of the society. For full particulars, address the American Society for the Study of Sterility, 20 Magnolia Terrace, Springfield, Mass.

(Continued on Page 636)

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HAZELDEN FOUNDATION

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(Continued from Page 634)

COURSE IN POSTGRADUATE GASTROENTEROLOGY

The National Gastroenterological Association announces that its course in postgraduate gastroenterology will be given at the Hotel Statler in New York City on October 12, 13, 14.

The course, which will again be under the personal direction of Dr. Owen H. Wangensteen, professor of surgery, University of Minnesota Medical School, will cover the following subjects: diseases of the mouth, diseases of the esophagus, peptic ulcer diseases of the stomach, diseases of the pancreas, cholecystic disease, psychosomatic aspects of gastrointestinal disease, disease of the liver, diseases of the colon and rectum, and other miscellaneous subjects including pathology and physiology, radiology, gastroscopy, et cetera.

The distinguished faculty for the course has been chosen from medical schools in New York City as well as out of town.

For further information and enrollment write to the National Gastroenterological Association, Dept. GSJ, 1819 Broadway, New York 23, N. Y.

PLASTIC SURGERY AWARD

The Foundation of the American Society of Plastic and Reconstructive Surgery is offering awards of $300 (first prize) and $200 (second prize) and a certificate of merit for essays on some original unpublished subject in plastic surgery.

Competition is limited to residents in plastic surgery in recognized hospitals and to plastic surgeons who have been in such specific practice for not more than five years. The first-prize essay will appear on the program of the forthcoming annual meeting of the American Society of Plastic and Reconstructive Surgery, to be held in Mexico City November 27 through 29, 1950. Essays must be received before August 15, 1950.

Full information can be obtained from the secretary, Dr. Clarence R. Straatsma, 66 East 79th Street, New York, N. Y.

FELLOWSHIP IN MEDICINE AVAILABLE

The American College of Physicians announces that a limited number of fellowships in medicine will be available from July 1, 1951 to June 30, 1952. These fellowships are designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in internal medicine. Assurance must be provided that the applicant will be acceptable in the laboratory or clinic of his choice and that he will be provided with the facilities necessary for the proper pursuit of his work.

The stipend will be from $2,200 to $3,200. Application forms will be supplied on request to the Amer-

(Continued on Page 638)

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FELLOWSHIPS IN MEDICINE AVAILABLE

(Continued from Page 636)

ican College of Physicians, 4200 Pine Street, Philadelphia 4, Pa., and must be submitted in duplicate not later than October 1, 1950. Announcement of awards will be made in November, 1950.

MISSISSIPPI VALLEY ESSAY CONTEST

The tenth annual essay contest of the Mississippi Valley Medical Society which provides a cash prize of $100, a gold medal and a certificate of award for the best unpublished essay on any subject of general medical interest (including medical economies and education) and practical value to the general practitioner of medicine will again be held in 1950. The winner will be invited to present his contribution before the fifteenth annual meeting of the Mississippi Valley Medical Society in Springfield in September, 1950. Further details may be obtained from Dr. Harold Swanberg, Secretary, 209 W.C.U. Building, Quincy, Illinois.

MINNESOTA SOCIETY OF INTERNAL MEDICINE

The spring meeting of the Minnesota Society of Internal Medicine was held in Duluth on May 27. Program chairman for the event was Dr. Paul G. Boman, Duluth. Eighteen papers on various topics in internal medicine were presented during the one-day session.

MINNESOTA SURGICAL SOCIETY

The Minnesota Surgical Society held its annual meeting in Rochester on May 12. Clinics in various phases of surgery were held at Colonial, St. Mary's, Kahler and Worrall Hospitals in the morning. The afternoon session consisted of presentation of papers.

Elected president of the society was Dr. Willard D. White, Minneapolis. Other officers elected include Dr. E. Starr Judd, Jr., Rochester, vice president, and Dr. M. G. Gillespie, Duluth, secretary-treasurer.

BROWN-REDWOOD-WATONWAN COUNTY SOCIETY

A talk on the Minnesota medical publicity program was a feature of the annual meeting of the Brown-Redwood-Watonwan County Medical Society held in New Ulm on May 18. Dr. E. J. Nielson, Mankato, discussed the publicity program prepared by the Minnesota State Medical Association. A discussion was also held on the possibilities of forming blood banks in the various cities of Brown County.

SOUTHWESTERN MINNESOTA SOCIETY

The regular monthly meeting of the Southwestern Minnesota Medical Society was held in Pipestone on May 8. Principal speaker at the meeting was Dr. Clarence Dennis, professor of surgery at the University of Minnesota, who spoke on "The Acute Abdomen."

(Continued on Page 640)

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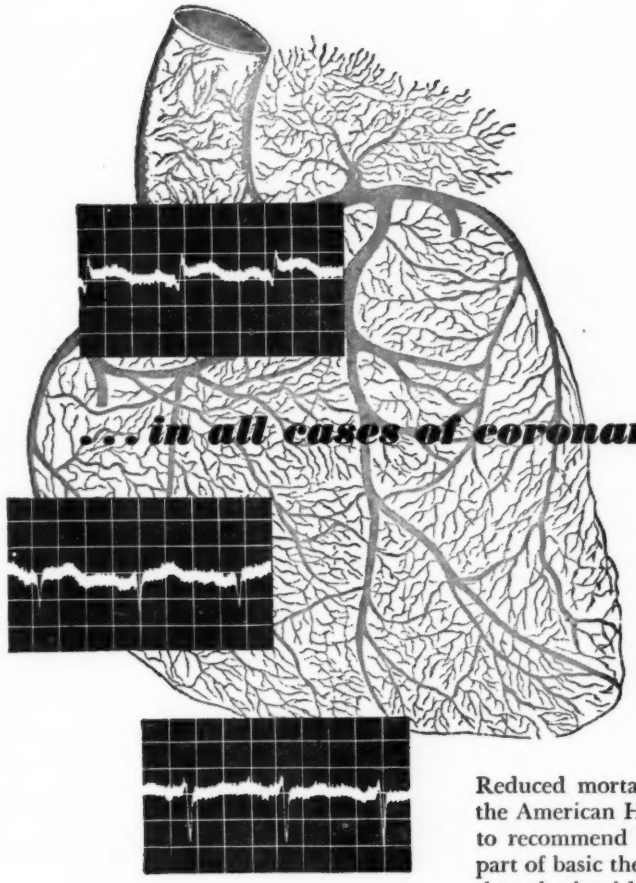

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Reduced mortality and morbidity have led the American Heart Association study group to recommend the use of anticoagulants as part of basic therapy "in all cases of coronary thrombosis with myocardial infarction."[1]

Long-acting Depo*-Heparin preparations meet the clinical requirements for prompt and readily controlled anticoagulant effects in the treatment of coronary heart disease. Depo-Heparin Sodium, with or without vasoconstrictors, provides the natural anticoagulant in a gelatin and dextrose vehicle to produce anticoagulant effects for 24 hours or longer with a single injection.

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1. Wright, et al: Am. Heart J. 36, 801 (Dec.) 1948.

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SOUTHWESTERN MINNESOTA SOCIETY

(Continued from Page 638)

During the business session the society's executive committee was instructed to consider the formation of a grievance committee to review criticism and complaints which might arise concerning medical care.

WASHINGTON COUNTY SOCIETY

The Washington County Medical Society held its regular monthly meeting at Forest Lake on May 9. At the meeting, which was for business only, members considered requests from the Social Welfare Department of the State of Minnesota and acted on the recommendations of the Committee on Public Education of the Minnesota State Medical Association concerning medical publicity.

A special meeting with the Welfare Board was planned for June 6 at Stillwater to consider fees.

The "forty education posters," recommended at the medical-press conference in Saint Paul on April 21, were the subject of a lively discussion that became fairly warm at times. Representatives of the four county newspapers also took part in the discussion. The final result: it was moved that all forty posters be run by the four newspapers in the county, to be paid for by members of the county medical society.

The society members also voted to establish a grievance committee, to be administered by the advisory committee.

Woman's Auxiliary

AUXILIARY HEARS NURSE RECRUITMENT PROGRAM

The Auxiliary of the Southwestern Minnesota Medical Society met at the home of Dr. and Mrs. F. L. Schade in Worthington on April 24 for a program on nurse recruitment.

Guest speaker was Marlene Erickson of Northwestern Hospital, Minneapolis. She spoke on methods of nurse recruitment through the local schools. Miss Erickson was introduced by Mrs. Marion Neilson, program chairman.

Mrs. David Halpern, Brewster, discussed what local communities and the medical auxiliary can do to encourage girls to enter the profession.

Dorothy Petsch, Worthington Hospital superintendent, told of plans for the nurse procurement program at the Worthington high school career day.

Special guests at the meeting were the new student nurses from Fairview Hospital in Minneapolis. The four girls went on duty in April. They are participating in the rural nursing affiliation program conducted through a local hospital.

The girls are Delores and Doris Johnson, twin sisters from Litchfield; Aida Hoff of Grantsburg, Wisconsin, and Erma Hellickson of Scobey, Montana.

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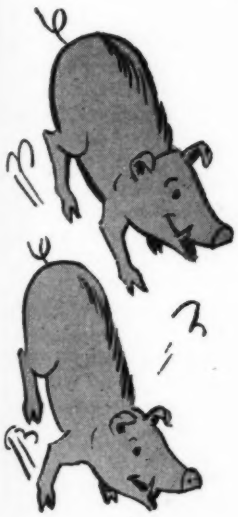

Usually the last one to be paid is the family doctor, and very often, no attention is given by him to the very important matter of commencing collection work *promptly after due date.* Too many doctors are going "hog wild" on this point and fail to realize its significance. Though startling as they may be, the figures shown in the following table are the factual result of authoritative studies, and they apply to the doctor as well as to the businessman.

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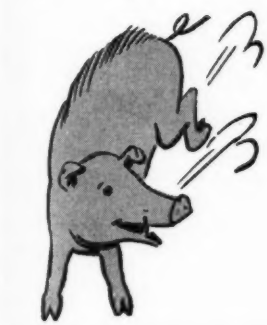
Accounts 60	days	past due are	93% collectible.
Accounts 90	days	past due are	85% collectible.
Accounts 6	months	past due are	70% collectible.
Accounts 1	year	past due are	40% collectible.
Accounts 2	years	past due are	25% collectible.
Accounts 3	years	past due are	18% collectible.
Accounts 5	years	past due are	practically lost.



THE OUTLOOK ISN'T BRIGHT. More business and professional men look for lower profits than hope for higher earnings this year. That's because of lower prices and higher costs. Proper credit control is more important today than at any time since the war. Jobless at present are at a postwar high of 4½ million. Unemployment is likely to prove more of a headache than inflation.

NOW IS THE TIME to go after those "Receivables." You can't afford to let even one of them get away when it's so easy to get your money by using our tested and proven plan. This system has the "velvet touch" with the "dynamite punch." Your money is paid directly to you and you retain your debtor's good will. Get started now by using the coupon below or just sign and return for more information.

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Of General Interest

The directory issue of **Graphics,** the official publication of the Association of Medical Illustrators, contains the name, address, training, professional experience and reference to major published work of each member. The issue, which was published on June 1, is available to persons requiring medical illustration service and will be sent, free of charge, upon request to the editor, Miss Helen Lorraine, 5212 Sylvan Road, Richmond 25, Virginia.

* * *

Captain Eugene V. Meyerding, M.C., U.S.A.F., son of Dr. and Mrs. E. A. Meyerding of Saint Paul, was married on May 19 to Patricia Elliot Lord, daughter of Colonel and Mrs. Wilbur Storn Elliot of Honolulu. Captain Meyerding is surgical resident at the Triplet General Hospital in Honolulu. He is a graduate of St. Thomas Military Academy and the University of Minnesota Medical School.

* * *

Dr. Alan Challman, Minneapolis, was scheduled to return on June 26 from a six-week tour of Army hospitals in Germany and Austria. He was selected by the Surgeon General of the Army to make the visits, which were for purposes of teaching and consultation.

* * *

Four physicians, comprising the **Litchfield Clinic,** are now conducting their practices in a newly constructed clinic building in Litchfield. The physicians are Dr. H. E. Wilmot, Dr. C. A. Wilmot, Dr. D. E. Dille and Dr. W. A. Chadbourn.

Their new clinic building, which was completed early this spring, is a one-story structure of modern design and construction. It houses four physicians' suites, each one consisting of an office and two treatment rooms, plus a laboratory, x-ray room, operating room, business office, and pharmacy. The building measures 55 by 66 feet, has a full basement for storage and other facilities, and is designed so that the flat roof can be flooded with a layer of water for cooling in the summer.

An open house, at which the clinic's facilities were open for public inspection, was held on April 1 and was attended by a large number of local residents.

* * *

Members of the Scott-Carver County Medical Society heard an address by **Dr. Edward T. Evans,** Minneapolis, at their meeting on April 18. Dr. Evans presented an illustrated lecture on the differential diagnosis of back pains, stressing the diagnosis of slipped intervertebral disc.

* * *

Dr. Paul Carpenter, formerly of Kansas City, Kansas, has become a staff member of the Oliver Clinic in Graceville. He began his duties at the clinic on April 3.

Dr. Gordon R. Kamman, Saint Paul, has been named deputy commissioner of mental health in Minnesota by Dr. Ralph Rossen, commissioner. **Dr. Lawrence R. Gowan,** Duluth, has been appointed supervisor of the consultative services. Both men will serve on a part-time basis while continuing the private practice of pyschiatry.

* * *

Dr. Clyde A. Undine, Minneapolis, attended the convention of the American College of Physicians in Boston, Massachusetts, April 17 through 21.

* * *

It was announced in May that **Dr. Robert M. Lundblad,** Duluth, planned to begin the practice of medicine in Clara City on July 1. Dr. Lundblad is a graduate of the University of Minnesota Medical School.

* * *

Dr. Andrew Sinamark, Hibbing, was a member of a three-man panel discussion on socialized medicine at a meeting of the Parent-Teachers' Association in Nashwauk on May 23.

* * *

Thirty-nine former fellows and residents of **Dr. Henry E. Michelson** gathered for a testimonial dinner to him at the Minneapolis Club on May 5. The guest list included dermatologists from Chicago, Cincinnati and the Mayo Clinic. Dr. Michelson had completed twenty-five years of service as chief of the division of dermatology at the University of Minnesota. He was presented with a silver service at the dinner, which was arranged by Drs. Laymon, Lynch, Madden and Rusten.

Previously, on April 15, Dr. Michelson was elected president of the American Board of Dermatology and Syphilology at a meeting held in Washington, D. C.

* * *

Dr. S. A. Slater, superintendent of the Southwestern Minnesota Sanatorium, was re-elected to the board of directors of the National Tuberculosis Association at a meeting in Washington, D. C., on April 28 and 29. Dr. Slater's new term as a director will be his twelfth.

* * *

On May 6, **Dr. Joseph Kurtin** was married to Miss Ruth Witkowski in Cudahy, Wisconsin. Dr. Kurtin is now practicing medicine in Blooming Prairie with his brother, Dr. H. J. Kurtin.

* * *

Dr. Albert J. Schroeder was guest pediatric speaker at a meeting of the American Society of Dentistry for Children on April 18. The meeting was held in Coffman Memorial Union at the University of Minnesota.

(Continued on Page 644)

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(Continued from Page 642)

A plaque in memory of **Dr. Justus Ohage,** who performed the first successful operation in this country for the removal of a gall bladder, was presented to St. Joseph's Hospital, Saint Paul, at a staff meeting on May 10. The presentation was made by Dr. Ohage's son, Dr. Justus Ohage, Jr., of Saint Paul. The gall-bladder operation was performed at St. Joseph's Hospital on September 24, 1886, and was a milestone in gall-bladder surgery in this country.

* * *

Early in May **Dr. W. R. Miller,** Red Wing, attended a two-day meeting of the Henry Ford Hospital Medical Association at Detroit, Michigan. Dr. Miller presented a paper entitled, "The Effect of Radioactive Phosphorus on Gastric Acidity."

* * *

A "good citizenship" medal and a citation were presented to **Dr. Karl Pfuetze,** medical director of the Mineral Springs Sanatorium, at an Americanism Day program in Cannon Falls on May 1. The presentation was made by the Nelson-Scofield post of the Veterans of Foreign Wars, sponsors of the program.

* * *

Dr. Leo G. Rigler, chief of the radiology department at the University of Minnesota, will be one of the medical mission sponsored by the Unitarian Service Committee to visit Japan in July to present present-day medical advances to representatives of forty-six Japanese medical schools.

* * *

Dr. Burton Rosenholtz has returned to Saint Paul and resumed the practice of pediatrics, with offices at 1999 Ford Parkway.

* * *

Dr. H. M. Wikoff, Bemidji, has been named chairman of the local county medical society, following the resignation of Dr. Charles W. Vandersluis. On May 8, Dr. Wikoff attended a meeting of the economics committee of the Upper Mississippi Medical Society at Brainerd.

* * *

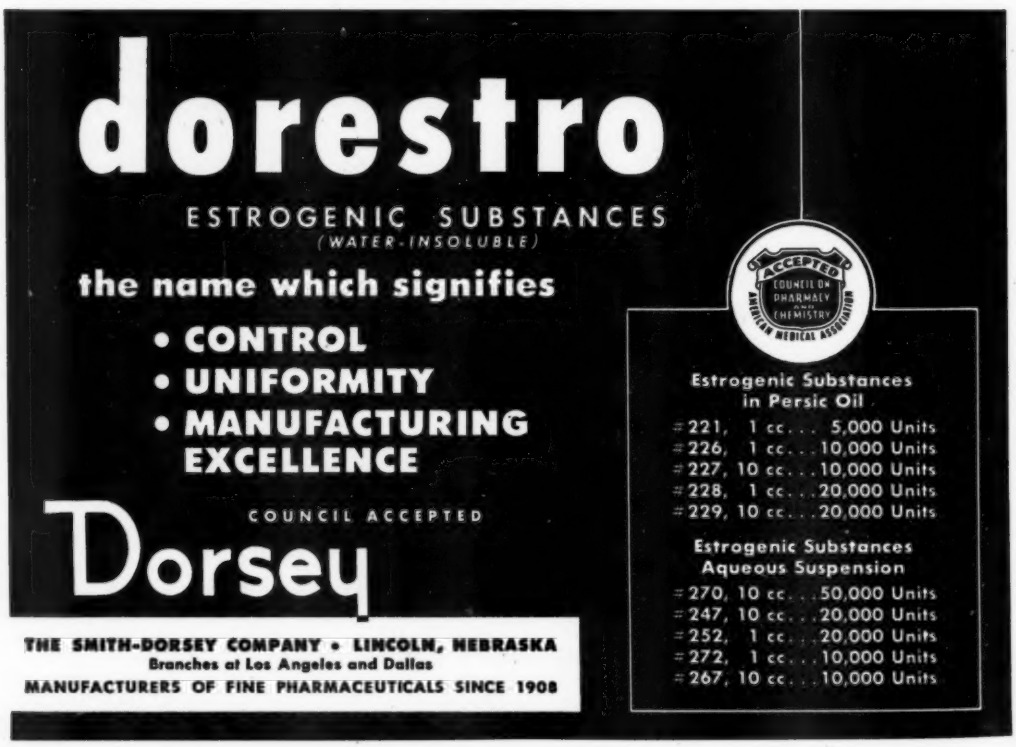
Dr. and Mrs. M. C. Piper, Rochester, left on April 22 for La Canada, California, where they are now living. Shortly before leaving Rochester, Dr. Piper had retired as a staff member of the Mayo Clinic.

* * *

A talk on socialized medicine was given by **Dr. Roy C. Pedersen,** Duluth, at a meeting of the Men's Brotherhood of the First Lutheran Church in Duluth on April 18.

* * *

After practicing in Grove City for a year and a half, **Dr. Kenneth J. Kelley** moved his office to Litchfield on April 1. A graduate of the University of Minnesota Medical School in 1944, Dr. Kelley interned at Swedish Hospital, Minneapolis, and then served



Minnesota State Medical Association's Annual Convention

Duluth, Minnesota

June 12, 13, & 14, 1950

OFFICIAL REGISTRATION FIGURES

Doctors	1,053
Nurses, Dietitians, Technicians, Social Workers and Medical Secretaries	457
Scientific Exhibitors	42
Commercial Exhibitors	235
Women's Auxiliary	330
Guests (Miscellaneous)	176
TOTAL	2,293

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in the Navy until late in 1946. He then practiced in Big Fork before moving to Grove City.

* * *

Among the speakers at the annual meeting of the Minnesota Society of Medical Technologists in Minneapolis on May 19 was **Dr. Lyle A. Weed,** Rochester, who discussed the bacteriological examination of tissues.

* * *

Dr. Orville Rotnem, formerly of Mabel, is now conducting his practice in Harmony. A graduate of the University of Minnesota Medical School, Dr. Rotnem served his internship at Milwaukee County Hospital, after which he became a surgical resident there. Before beginning his practice at Mabel, he served in the Army.

* * *

Dr. D. M. Simonetti, formerly located at 328 East Hennepin, Minneapolis, has moved his office to 510 Physicians and Surgeons Building.

* * *

"Tuberculosis Control in Institutions for the Mentally Ill" is the title of a paper being presented by **Dr. Edmund W. Miller,** superintendent of the Anoka State Hospital, at the annual meeting of the American College of Chest Physicians in San Francisco on June 25.

Principal speaker at a St. Luke's Hospital fund drive dinner in St. Paul on April 25 was **Dr. Owen H. Wangensteen,** chief of surgery at the University of Minnesota. The hospital was starting a campaign to raise $750,000 for a modernization program.

* * *

Dr. Gerald N. Hofmann, Cannon Falls, was married to Miss Ardis Nolda Hougo in Cannon Falls on April 12. Dr. Hofmann is assistant medical director at the Mineral Springs Sanatorium.

* * *

It was announced on April 17 that **Dr. Nels G. Mortenson** had resigned from the staff of the Fergus Falls State Hospital to accept a position on the staff at the Minnesota Soldier's Home in Minneapolis. Dr. Mortenson had been affiliated with the Fergus Falls hospital since November, 1944.

* * *

Dr. Frederic F. Wippermann, Minneapolis, was elected president of the North Central Alumni Association of **Phi Beta Pi,** medical fraternity, at the association's annual meeting in Minneapolis in April. Other officers elected include Dr. Karl Sandt, vice president, and Dr. Howard Frykman, secretary-treasurer, both of Minneapolis. Dr. Norbert O. Hanson, Rochester, and Dr. Phillip Hollenbeck, St. Cloud, were elected members-at-large.

* * *

Two Red Wing physicians presented papers at a meeting of the Saint Paul Surgical Society on April 19. Dr. E. H. Juers spoke on "X-Ray Diagnosis of Abnormalities of the Veins of the Arms." Dr. R. F. Hedin discussed the results of an investigation into the effect of radioactive substances on stomach acidity.

* * *

At a meeting in Albert Lea on May 10 sponsored by the Freeborn County Public Health Society, **Dr. Benjamin Spock,** director of the Child Guidance Clinic in Rochester, spoke on "The Emotional versus the Democratic Way of Dealing with Emotional Problems in Childhood."

* * *

Dr. William B. Gallagher, Waseca, discontinued his practice on April 20 and reported to Valley Forge General Hospital, Phoenixville, Pennsylvania, on May 1 for indoctrination into the Army. A graduate of the University of Minnesota in 1947, Dr. Gallagher served his internship at Milwaukee County Hospital. His term of service in the Army is expected to be two years.

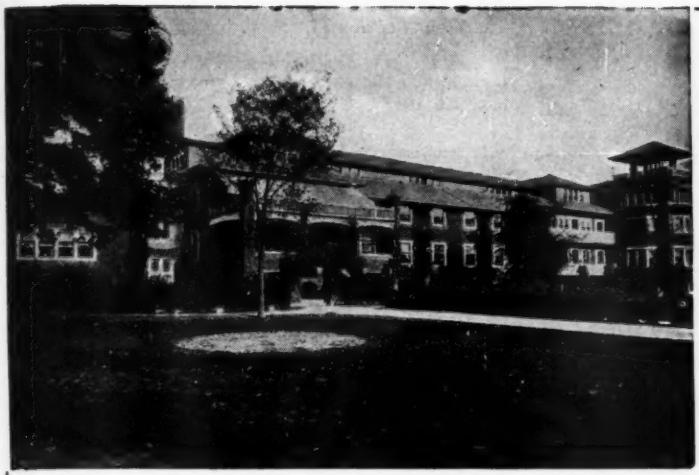
* * *

At a meeting of the Crookston Rotary Club on May 4, **Dr. D. E. Pohl** of Crookston talked on the subject of heart disease.

* * *

Dr. Martin O. Wallace, Duluth, was moderator at a panel discussion on "The Whole Child" at the Duluth and Arrowhead Health Day on April 14.

(Continued on Page 648)



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SURGERY—Intensive Course in Surgical Technic, two weeks, starting June 19, July 24, August 21.
Surgical Technic, Surgical Anatomy and Clinical Surgery, four weeks, starting July 10, August 7, September 11.
Personal Course in General Surgery, two weeks, starting September 25.
Surgery of Colon and Rectum, one week, starting September 11.
Esophageal Surgery, one week, starting October 16.
Breast and Thyroid Surgery, one week, starting June 26, October 2.
Thoracic Surgery, one week, starting June 12, October 9.
Gallbladder Surgery, ten hours, starting June 19, October 23.
Fractures and Traumatic Surgery, two weeks starting June 12, October 9.
Basic Principles in General Surgery, two weeks starting September 11.
GYNECOLOGY—Intensive Course, two weeks, starting June 19, September 25.
Vaginal Approach to Pelvic Surgery, one week, starting September 18.
OBSTETRICS—Intensive Course, two weeks, starting September 11.
MEDICINE—Intensive General Course, two weeks, starting October 2.
Electrocardiography and Heart Disease, two weeks, starting July 17.
Gastroscopy, two weeks, starting July 17, September 25.
DERMATOLOGY—Formal Course, two weeks, starting October 16. Informal Clinical Course every two weeks.
UROLOGY—Intensive Course, two weeks, starting September 25.
Cystoscopy, Ten Day Practical Course, every two weeks.

General, Intensive and Special Courses in all Branches of Medicine, Surgery and the Specialties.

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(Continued from Page 646)

Dr. Thomas J. Dry, Rochester, will be the new president of the Minnesota Heart Association, succeeding Dr. John F. Briggs, Saint Paul. He will begin his new duties at the annual meeting of the association in July. Secretary of the organization is Dr. Earl E. Barrett, Duluth.

* * *

A survey of facilities available for care of the chronically ill in Ramsey County was made during May by the Saint Paul Area Public Health Council and the Women's Auxiliary of the Ramsey County Medical Society. **Dr. Ralph L. Olsen,** chairman of the council's committee on chronic and convalescent care, said that the information compiled would be used by hospitals, rest and nursing homes and other institutions in planning for helping the chronically ill.

* * *

Dr. John M. Adams, associate professor of pediatrics at the University of Minnesota, has been named chairman of the department of pediatrics in the new medical school now being organized at the University of California at Los Angeles. Although classes at the new school will not begin until 1952, Dr. Adams will assume his duties there this fall.

A graduate of Columbia University College of Physicians and Surgeons, Dr. Adams interned at New Haven General Hospital, then obtained a Ph.D. degree at the University of Minnesota in 1937. He was in private practice in Minneapolis for six years, then joined the staff of the University on a full-time basis in 1943.

* * *

It was announced on April 21 that **Dr. S. B. Seitz** planned to return to Barnesville to practice early in May. Dr. Seitz moved from Barnesville to Richardton, North Dakota, last fall.

* * *

Dr. O. F. Mellby, Thief River Falls, left on May 6 for New York City, from where he planned to fly to Norway for six weeks of visiting relatives and sightseeing.

* * *

At the annual meeting of the North Central Section of the American College Health Association, held at the University of Wisconsin on April 28, **Dr. J. W. Hanson,** director of Carleton College health service, was installed as president of the organization.

* * *

Dr. Robert W. Wheeler has joined the staff of the Edina Medical Center. Formerly on the staffs of the University and Veterans Hospitals in Minneapolis, Dr. Wheeler will specialize in otolaryngology.

* * *

Dr. Merton A. Johnson, Storden, was elected chairman of the Cottonwood County Health Council at its annual meeting in Storden on April 25.

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Minneapolis Minnesota

The American Cancer Society recognized Minnesota's leadership in cancer detection at an award dinner in Minneapolis late in April. The Minnesota Division of the American Cancer Society was presented with a plaque honoring Minnesota for its progress in detecting internal cancer. The plaque was accepted on behalf of the organization by **Dr. Arthur H. Wells,** Duluth, president of the Minnesota Division.

* * *

On May 15, **Dr. Norman Pullman,** formerly of Lake City, Iowa, began practice in Valley Springs, thus giving the community its second physician.

* * *

During most of April and May, **Dr. and Mrs. F. H. Krusen,** Rochester, were in Europe where Dr. Krusen delivered six lectures on various phases of physical medicine and rehabilitation. Among cities in which he spoke were Copenhagen, Edinburgh, London and Dublin.

* * *

Dr. Charles W. Parker, Wadena, presented a talk on socialized medicine at a meeting of the Wadena Lions Club on May 8. He described the bad situation produced by socialized medicine in England.

* * *

The engagement of **Dr. E. Harvey O'Phelan** to Miss Kathleen Elizabeth Bartl was announced on May 7. Their wedding was planned for June 10 in Saint Paul. Dr. O'Phelan, a graduate of the University of Minnesota Medical School, is a fellow in orthopedic surgery at Minneapolis Veterans Hospital.

* * *

Dr. George H. Olds, New Richland, was named secretary-treasurer of the Waseca County Medical Society on May 2. Dr. Olds was named to fill the unexpired term of Dr. William Gallagher, who was called into military service.

* * *

Announcement was made on May 4 that **Dr. Don Bucher** of Sioux City, Iowa, would begin the practice of medicine in Starbuck about July 1.

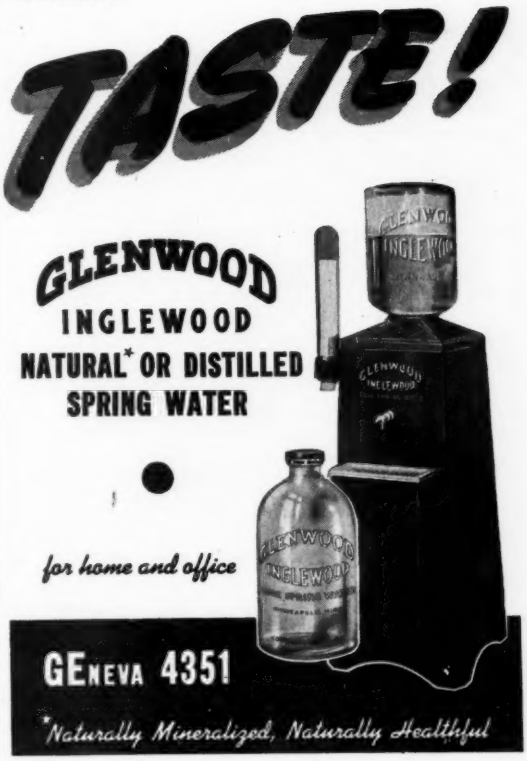
* * *

The Minnesota Branch of the American Medical Women's Association had a luncheon meeting at the Duluth Atheletic Club on June 12, the first day of the State Convention.

Dr. Selma Mueller of Duluth gave an interesting talk of her medical experience in China. Dr. Nellie Barsness of Saint Paul, who is regional director, is also the Minnesota delegate to the annual meeting of the American Medical Women's Association in Pebble Beach, California, June 19-22.

* * *

It was announced on May 13 that Dr. Hector Brown, formerly of Bemidji and recently of New York State, had purchased the private hospital at Walker belonging to **Dr. O. F. Ringle** and would take possession on June 1.



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$10,000.00 accidental death *$50.00 weekly indemnity, accident and sickness*	**$16.00** *Quarterly*
$15,000.00 accidental death *$75.00 weekly indemnity, accident and sickness*	**$24.00** *Quarterly*
$20,000.00 accidental death *$100.00 weekly indemnity, accident and sickness*	**$32.00** *Quarterly*

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HOSPITAL NEWS

At a special meeting of the Gaylord Community Club on April 27, a resolution was passed to construct during the summer a municipal hospital for **Gaylord** and the surrounding area. The quick action was prompted by an announcement by Dr. D. C. Olson that he planned to close his hospital permanently. Dr. Olson agreed to keep his hospital open until the new hospital was completed, probably this coming fall.

* * *

St. Lucas Deaconness Hospital, Faribault.—Dr. Paul F. Meyer, Faribault, was elected president of the St. Lucas Deaconness Hospital medical staff at a meeting held on May 9. Other officers elected include Dr. C. A. Rohrer, Waterviller, vice presiden; Dr. J. J. Kolars, Faribault, secretary, and Dr. F. R. Huxley, Faribault, member-at-large on the executive committee.

* * *

Kanabec Hospital, Mora—Dr. C. S. Bossert of Mora was elected chief-of-staff of the Kanabec Hospital at an organizational meeting of the staff on May 11.

* * *

Dedication of the new **Louis Weiner Memorial Hospital** in Marshall took place on May 25. When completely furnished, the new hospital will have approximately fifty beds, 12 bassinettes and four cribs.

The dedication ceremonies included a presentation of the hospital staff and an address by Governor Luther W. Youngdahl.

BLUE CROSS-BLUE SHIELD NEWS—June, 1950

Blue Shield enrollment more than doubled in one year's time. On March 30 of this year there were 315,226 Minnesotans enrolled in Blue Shield compared with 151,711 enrolled on March 30 a year ago. Enrollment in March was especially high with 22,771 Minnesotans added to Blue Shield rolls; of these, 12,367 are non-group subscribers whose contracts went into effect March 1.

Also more than doubled are the Blue Shield benefits subscribers received during the first quarter of this year compared with the same period in 1949. This year, Blue Shields benefits amounted to $411,133 during the first quarter compared with $191,116 subscribers received in Blue Shield benefits during this same three-month period in 1949. Payments to doctors during March for services to Blue Shield subscribers totalled $181,622 which is $49,380 more than the payments made to doctors during February.

Of the total 10,289 claims submitted during the first quarter of this year, representing 12,679 medical-surgical services to Blue Shield subscribers, 79 per cent or 8,132 claims were for Blue Shield services subscribers received in hospitals; 20.6 per cent or 2,118 claims were for services received in doctors' offices, and .4 per cent or 39 claims were for Blue Shield services subscribers received in homes.

Blue Shield benefits for surgical procedures during this three-month period totalled $255,174.53. Of these surgical procedures, benefits for appendectomies were

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the highest, amounting to $48,525; gynecology second highest, amounting to $33,916; bones, joints and tendons third highest, amounting to $30,550; tonsillectomies fourth highest, amounting to $19,512 in Blue Shield benefits.

Medical care to Blue Shield subscribers during this three-month period amounted to $89,711 and obstetrical care amounted to $47,335 in benefits. Of the related services provided by Blue Shield, endoscopy accounted for $7,840, x-ray for $7,204, anesthesia for $2,647, assisting and after care for $1,220 of the Blue Shield benefits provided during this three-month period.

Persons in the lower income group who receive unlimited subscriber benefits incurred 31.5 per cent of the total Blue Shield claims during the first three months of this year.

Blue Shield and Blue Cross plans were explained to doctors, hospital administrators and trustees at meetings held in Glenwood, Redwood Falls, Owatonna, Duluth, Bemidji, and the Twin Cities in conjunction with meetings of the Minnesota Hospital Association during March and April.

Arthur M. Calvin, executive director of the Blue Cross and Blue Shield plans, also gave lectures to University of Minnesota hospital administration and four-year medical students concerning these non-profit plans. Blue Cross and Blue Shield will also be discussed at medical staff meetings of various hospitals during the next several months.

Blue Cross enrollment as of March 31, 1950, reached the million mark with 1,004,084 Minnesotans enrolled.

PROGRESS IN MATERNAL AND INFANT HEALTH IN MINNESOTA

(Continued from Page 587)

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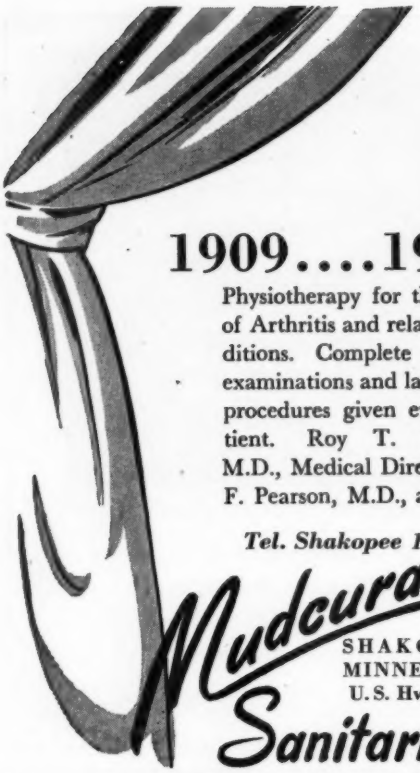

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BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical Libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

BREAST DEFORMITIES AND THEIR REPAIR. Jacques W. Maliniac, M.D. Clinical Professor of Plastic Reparative Surgery, and Associate Attending Plastic Reparative Surgeon, New York Polyclinic Medical School and Hospital, New York City; Attending Plastic Surgeon, Sydenham Hospital; Diplomate, American Board of Plastic Surgery. 193 pages. Illus. Price $10.00, cloth. New York: Grune & Stratton, 1950.

THE MANAGEMENT OF THE PATIENT WITH SEVERE BRONCHIAL ASTHMA. Maurice S. Segal, M.D. Assistant Professor of Medicine, Tufts College Medical School; Director Department of Inhalational Therapy, Boston City Hospital, Boston, Massachusetts. 158 pages. Illus. Price, $3.50, cloth. Springfield, Illinois: Charles C. Thomas, 1950.

PARKINSON'S DISEASE. Walter Buchler. 79 pages. Price $1.00, paper cover, $2.00, cloth. London, England: Walter Buchler, 1950.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Minneapolis Man Pleads Guilty

(Continued from Page 617)

an information charging him with the crime of swindling. Judge Larson stayed the sentence and placed the defendant on probation for five years.

Catterson, who has no medical education of any kind, obtained $100 from a north Minneapolis family on or about June 24, 1949. Catterson had offered to perform an abortion but disappeared after obtaining the money. Catterson was not located until April 7, 1950, at which time he was placed under arrest. Catterson readily admitted obtaining the $100, but stated that he never intended to do an abortion and had used those representations for the purpose of obtaining money. Nevertheless, Minneapolis police officers found a speculum and a syringe in Catterson's room. Catterson also admitted that he had two or three catheters in his possession, but these were not found.

Catterson stated to the Court that he was born in 1899; that he had been married and divorced four times. Catterson also admitted having a previous conviction in Lancaster County, Pennsylvania, for the crime of adultery. Judge Larson, in sentencing the defendant, told him that the Court was not optimistic about Catterson making good on probation; nevertheless, it was the opinion of every one concerned, that in view of the fact that twenty-four years had elapsed between Catterson's first conviction and his present violation of the law, an opportunity should be given him to demonstrate that he could comply with the laws of the State of Minnesota.

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FOR SALE—Medical library, surgical and diagnostic instruments, and a large number of orthopedic and fracture splints, formerly owned by the late Dr. Henry C. Cooney. For prices and further information write Mrs. H. C. Cooney, Princeton, Minnesota.

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